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RAILWAY GAZETTE
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CONTENTS

	PAGE
Editorials	317
Publications Received	321
The Scrap Heap	321
Overseas Railway Affairs	322
Road Transport Section	323
Our Eastern Approach to Persia	325
The Railways of Persia	327
Railway News Section	335
Personal	335
Transport Services and the War	337
Stock Market and Table	344

DIESEL RAILWAY TRACTION SUPPLEMENT

The October issue of THE RAILWAY GAZETTE *Supplement, illustrating and describing developments in Diesel Railway Traction, is now ready, price* 1s.

DISPATCH OF "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE *possesses the necessary permit and machinery for such dispatch, and any reader desirous of arranging for copies to be delivered to an agent or correspondent overseas should place the order with us together with the necessary delivery instructions.*

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas, as they are stopped under the provisions of Statutory Rules & Orders No. 1190 *of* 1940, *and No.* 359 *of* 1941

TO CALLERS AND TELEPHONERS

Until further notice our office hours are :—
Mondays to Fridays 9.30 *a.m. till* 5.0 *p.m.*
The office is closed on Saturdays

The Genesis of Persian Railways

IN view of the present interest in the transport system of Iran, in which railways have played a prominent part only within the past few years, certain past events in the history of railways in Persia (as it was then known) may be recalled. As long ago as 1868 a twenty-year exclusive right to construct railways in Persian territory was granted by the Shah to a group of English capitalists. The first line then projected was a six-mile connection between Teheran and Rey, but the proposal never got beyond the project stage. According to our constituent *The Railway News* of June 23, 1888, the first line actually to be constructed was that from Mahmoudabad, on the Caspian coast, to Amol 25 miles inland. Some five miles had then been laid and construction trains were working over that length; the locomotives were stated to be objects of unceasing wonder to the local population. The labour employed numbered about 2,000, mostly Italians and a variety of nomads and nondescripts previously engaged on the Baku section of the Trans-Caspian Railway. The Amol line was a purely commercial venture, and the chief difficulty experienced was the landing of materials from even light-draught steamers, which could not approach within three miles of the shore. The modern railways of Persia, which are described and illustrated on pages 327-334 in this issue, are the result of a great construction programme launched about 1927.

The Railway Financial Agreement

The Government has now issued the long promised White Paper which contains an outline of the revised financial arrangements between the Ministry of War Transport and the controlled railway undertakings. It does not add a great deal to the details which were given in THE RAILWAY GAZETTE of September 5, but it gives official status to certain points which so far had lacked it. The White Paper is given in full at page 341, and it will be seen that the provisions of the original agreement as to maintenance and renewals are to remain in being, as also are the previous arrangements as to payments by the controlled undertakings of one half of Exchequer grants made for A.R.P. measures, and revenue receipts and expenditure in respect of the requisitioning of privately owned wagons. The White Paper makes it clear that war damage suffered by the controlled undertakings since the outbreak of war, which is to be dealt with under the new scheme to be introduced by the Government for public utility undertakings, will not be charged as revenue expenditure. In view of the retrospective liabilities which the controlled undertakings will assume under the new scheme they are to retain at their disposal sums charged to the pool account for the year 1940. The control is to be continued for at least one year after the cessation of hostilities, and before that control ceases time is to be given for the operation of any statutory machinery governing the level of charges.

Co-ordinating Canal Resources

The Minister of War Transport has set up a Central Canal Committee under the chairmanship of the Parliamentary Secretary to the Ministry to advise him on the questions of policy affecting inland waterways, and to co-ordinate the work of six Regional Canal Committees. This step implements a recommendation in the report made by Mr. Frank Pick, who recently investigated the possibility of making more effective use of the canals and inland waterways of the country. As a result of Mr. Pick's recommendations, which are given at greater length at page 337, the six Regional Canal Committees, already in existence, have been re-constituted and strengthened to ensure that canals and canal facilities work as a unit and that the resources as a whole are used to the greatest advantage. The regional committees are to organise the effective operation of the canals and the efficient working of craft, survey traffic possibilities, ensure that traffic which may conveniently be waterborne is allocated to the canals so far as practicable, minimise empty running, and see that carriers keep their craft manned and in repair, where necessary arranging for the pooling of craft. Mr. Pick also recommended the establishment of a minimum guaranteed wage for canal workers, and it is stated that

XUM

negotiations have already resulted in agreement in most regions. A coal traffic survey which has been carried out in consultation with the Mines Department has already achieved an increase of 15 per cent. in canal-borne coal.

The Fastest Trains in Europe

While war conditions in Europe have caused diesel and petrol-engine railcar units to disappear from the timetables, and steam-operated services to be curtailed and reduced in speed, the minimum of change has been seen on electrically-operated lines, and particularly those which depend on hydro-electric power. So far as concerns the non-belligerent countries, Switzerland has practically a normal service running, and the four 60·6 m.p.h. Geneva—Lausanne schedules of her high-speed Geneva—Zurich trains are at present the fastest bookings in Europe. The fastest long-distance train in Europe at present is with little doubt the 11 a.m. from Paris to Bordeaux, which, as described in the review of European train services on p. 340, is booked to run the 362·1 miles including stops in 7 hr. 59 min., at an overall average of 51·8 m.p.h.; this entails five start-to-stop runs in succession at 52·1, 56·8, 53·0, 53·9, and 53·8 m.p.h., electrically worked throughout. Similarly over the electrically-operated Western Region main line, schedules up to 55·8 m.p.h. (between Versailles and Le Mans) are at present booked. Both this and the route previously mentioned lie entirely in German-occupied territory. Train frequency is also least affected on electrified lines; in Italy, for example, eight trains are scheduled in each direction daily over the 392·1 miles between Milan and Rome, at well separated intervals, at a general average of 40·7 m.p.h., and a highest overall speed of 44·4 m.p.h. Similarly in Great Britain, it is only on the electrically-operated routes of the Southern Railway that the fastest timings, such as London—Brighton in 60 min., have been maintained without alteration from peacetime standards.

Overseas Railway Traffics

Except in the case of the Buenos Ayres & Pacific, on which the improvement in traffics began earlier, the receipts of the British-owned Argentine railways for the 11th and 12th weeks of the financial year show even larger increases than those for the previous fortnight. The gains in pesos amount to 1,270,950 on the Central Argentine, to 748,000 on the Buenos Ayres Great Southern, to 520,000 on the Buenos Ayres Western, to 196,000 on the Buenos Ayres & Pacific, to 162,700 on the Entre Rios, and to 90,400 on the Argentine North Eastern. Antofagasta traffics for the first 38 weeks of 1941 are £704,490, an increase of £54,290, and the Leopoldina traffics of £972,392 for the same period show an improvement of £124,350.

	No. of week	Weekly traffics	Inc. or decrease	Aggregate traffic	Inc. or decrease
Buenos Ayres & Pacific* ...	12th	1,205	−80	15,551	+2,222
Buenos Ayres Great Southern*	12th	2,232	+443	24,410	+1,694
Buenos Ayres Western* ...	12th	930	+305	9,264	+1,877
Central Argentine*	12th	1,947	+584	21,389	+4,408
		£	£	£	£
Canadian Pacific	38th	915,600	+208,200	30,486,200	+7,135,600
Bombay, Baroda & Central India	24th	311,175	+48,150	4,922,175	+336,975

* Traffic returns in thousands of pesos

Traffic receipts of the Central Uruguay Railway for the first twelve weeks of the financial year amount to £252,361, an increase of £42,529 in sterling, and of $324,495 in currency.

Organisation of War Production

Suggestions well worthy of consideration in high quarters are made in a memorandum which has been prepared by the Engineering Industries Association for submission to the Government. The association is deeply concerned with the lagging of war production in the engineering industries and the memorandum has been prepared to demonstrate the way in which some of the essential principles of industrial production are being outraged by ill-conceived financial legislation. It is urged that the organisation of war production should be a matter for the producer, and not for Government officials; the Government, it is suggested, should retreat from the active position it has taken in industry and confine itself to purchasing what is needed and to providing adequate inducements and facilities for industry. The important point is made by the association that industrial organisation should be built up on industrial, and not on civil service, lines. There will be considerable support for the view that it is impossible to find enough officials with sufficient knowledge of industrial needs to govern a mass of individual businesses, and for a proposed production plan based on personal responsibility. The association urges that E.P.T. should be revised, that the producer should be given greater freedom in raising capital for what in his view are essential extensions, and that the whole business of production should be managed by a board of industrial specialists with authority and responsibility.

The Hiawatha Goes Diesel

The decision of the Chicago, Milwaukee, St. Paul & Pacific management to turn over the working of one of its Hiawatha streamliners to diesel propulsion can hardly fail to cause regret to those who still have faith in the future of the steam locomotive. For six years, first with the streamlined Atlantics specially built for the service, and later, in consequence of increased loads, with the more powerful semi-streamlined 4-6-4s, steam has maintained a fine "on time" record of well over 90 per cent. with these extremely fast trains, and has proved its ability to maintain start-to-stop schedules up to 81·0 m.p.h.—the record for steam, as compared with the 84·0 m.p.h. start-to-stop limit of the competing Burlington diesel streamliners—and to run freely in ordinary service conditions at a sustained speed of 100 m.p.h. However, the suitability and economy of the diesel engine for continuous high-speed running cannot be gainsaid, and now that its reliability has been proved by prolonged trial, there is little doubt that in the course of time many, if not the majority of the crack high-speed services in the United States will be turned over to this mode of propulsion. The temptation is the greater in the Western States, for the indigenous oil of California and the heavy grades through the Rockies together explain why the diesel engine has found greater favour west of Chicago than east of that city. The uncertain factor for the future is the relative cost of fuel oil and coal; and developments in the efficiency of steam propulsion will do much to prolong the life of the steam locomotive in countries which, like Great Britain, have good supplies of steam coal but must import their oil fuel.

Two-car Trains on U.S.A. Tramways

The use of two-car sets for street transport is being discontinued in the U.S.A., as these are slow in traffic. At page 672 of our December 27, 1940, issue we reproduced a picture of a two-car train in the service of the St. Louis Public Service Company, Missouri, and reported that a correspondent had advised us that this was the only company in the United States at present using two-car sets. We now learn from another correspondent that in both Cleveland and Boston the practice still prevails, as well as in St. Louis. He says that various city tramway lines in Cleveland are operated during peak hours with trains consisting of a motor-car and one or two trailers. In Boston, Massachusetts, the Boston Elevated Railway regularly operates two-car and three-car multiple-unit trains of tramcars on the lines leading into the Boylston Street subway. This subway, which our correspondent states he believes to be the longest tramway subway in the world, extends nearly four miles, from beyond Kenmore Square in the West End to the North station as an underground line, and then on an elevated structure to Lechmere Square in Cambridge. Formerly the Boston Elevated Railway also operated trains consisting of a motor-car and trailer, but this practice has been discontinued in recent years.

With a Railway Unit

The other day one of our correspondents visited a railway operating unit in the south of England. The headquarters were billeted in a spacious country house, and in the park were various huts. Round the table at the Officers' Mess

were men who work in peacetime on the G.W.R., the L.M.S.R., the L.N.E.R., and various Irish and South American railways. One of the most popular officers was the driver of a famous express. Every man in the unit had railway experience, and we learn that, in comparison with some fifty other military audiences to which our correspondent has lectured during the past year, they were much quicker in the uptake, and much readier to express their points of view and to ask sensible and pointed questions. In short, the impression left upon the civilian visitor was of keenness and efficiency on the part of officers and men. There was also an atmosphere of general friendliness, due partly to the geniality of the Commanding Officer, who at one time was well known in the railway world in Yorkshire. Compared with the last war there is much more mixing of officers and men, the majority of whom, as soon as they were released from the lecture, quickly vanished to take part in a dance at the village hall.

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Locomotive Individualism

There are certain phases of railway operation in which it is a moot point whether the development of modern methods has proved wholly advantageous. In locomotive running the urge to obtain the maximum possible mileage per machine has led to double and treble manning, to lengthy circular tours, particularly by engines of mixed traffic types, so that they are only seen at their home sheds at irregular intervals, and so on. It is almost inevitable in such conditions that shed staffs and engine-crews take little personal interest in locomotives that they would, in earlier years, have regarded as their own particular care, and that maintenance suffers; indeed, if a careful balance were struck between past and present methods, with all allowance for the gain derived from greater efficiency in design and the greater mastery of the large modern locomotive over its work, one wonders if we are today so far ahead of our forefathers as we imagine. It is interesting in this connection to read in our American contemporary *Trains* how the wheel has come full circle on at least one American line—the Erie—on the business services into and out of Jersey City. " Each run has its own locomotive assigned to it, to facilitate methodical dispatching. The crews, knowing they will have the same locomotive day after day, take a certain pride in keeping them ' dolled up ' and scrupulously clean. The railroad permits certain privileges to these crews, with the result that many engines are really beautifully kept." Indulgence is even extended, within limits, to the æsthetic leanings of the men in the matter of paint and external decoration, but there is little doubt that every factor making for devotion of engine-sheds and engine-crews to their charges pays in the end.

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Scenic Travel

In the absence of other amenities and distractions, a glimpse of unusual scenery or some phenomenon of nature will often alleviate the monotony of a long railway journey. Mr. Thomas P. Brown, the enterprising Publicity Manager of the Western Pacific Railroad Company, has sent us, as specimens of what he does to make pleasant the journeys of passengers, a number of brief articles describing features of outstanding scenic interest encountered by travellers on his system. One of these is Lassen Peak, the most recently active volcano in the U.S.A., which in the course of eruptions in May, 1915, distinguished itself by hurling a mushroom cloud four miles high. Rising to 10,453 ft., this peak is situated in the Lassen Volcanic National Park, skirted by the Western Pacific as it winds down through the Sierra Nevada. Then there is the Humboldt, Nevada's largest river, whose valley is flanked by magnificent mountain ranges ; the railway keeps the river company for 160 miles, crossing and recrossing it 26 times. Finally, west of the great Salt Lake, there are the Bonneville salt beds, well known to racing motorists. Beginning near Salduro, the track of the Western Pacific is laid for 8 miles on the shining crystals of these beds, which are about 30 miles long, 10 to 15 miles wide, and 200 sq. miles in area.

The Future of Colonial Railways

THE period chosen by Mr. J. W. Spiller, Chief Engineer to the Crown Agents for the Colonies, for a review of Colonial railway development* followed a decade of the greatest expansion in their history and itself included the most difficult operating years in that history, as a consequence of the world-wide depression, which, it should be noted, was not brought about by any natural causes such as a succession of bad harvests or the failure of sources of raw materials. The year 1929 was a good datum year, for the period 1929-37 included a complete trade cycle, the volume of world trade and industry being approximately equal in these two years with much reduced activity between them. These variations were directly reflected in the prosperity of colonial railways. This review of a past period is of value as a guide for the future. The past 20 years have seen great expansion in the demand for tropical products, and the author suggests that a similar increase may be expected in the future, and that the future development of colonial railways should be based on this assumption. A series of tables comparing revenues on the Nigerian, Gold Coast, Kenya & Uganda, Tanganyika, Ceylon, and Federated Malay States Railways in 1919 and 1929 shows the almost unbroken increased percentage during this period, and a final table summarises the results on these six lines, the percentage increases being as follow:—

Collective Results of the Six Railways	Percentage Increase, 1919-29
Route-mileage	43
Coaching revenue	39
Goods ,, ...	124
Total ,, ...	91
Net receipts	145

Although the expansion of mileage took place in less-developed areas, the average receipts per mile increased, proving the justification for the extensions. During this decade more railways were constructed in the Colonies and there was a greater increase in railway revenue than in any other, results that contributed largely to Colonial development and prosperity.

Coming to the period 1929-38, with which the review is mainly concerned, the author deals at length with world trade fluctuations and commodity regulation, illustrating his text with numerous tables indicative of the varying production and values of such Colonial products as tin, rubber—and incidentally motor vehicles—cocoa, coffee, and tea; the paper also contains a wealth of graphs illustrating the fluctuations in world trade, industrial production, manufacturing industries, world production of primary commodities and raw materials, the trend of commodity production in the various Colonies, world production and stocks of raw materials, the trend of domestic exports from the various Colonies, and gross receipts of the six largest colonial railways year by year. A particularly interesting section of the paper deals with road competition, leading up to the consideration in detail of the working results of the six railways. In the case of each railway a table is included of the indexes of these results (1929 = 100) enabling comparison to be made between the yearly fluctuations of (1) the sterling value of world trade; (2) the foreign trade of the colony concerned; (3) railway route-mileage; (4) coaching, (5) goods, and (6) total gross receipts; and (7) net receipts. Incidentally, another table comparing the freight rates of the six railways is useful, and reads as follows:—

Railway	Average Rate per Paying Ton-mile in 1937
Nigeria	1·71d.
Gold Coast	3·11d.
Kenya & Uganda	1·35d.
Tanganyika	2·08d.
Ceylon	—
Federated Malay States	1·36d.

The paper concludes with a section entitled " The Coming Decade," in which the author expresses his belief that a wider expansion of world requirements of raw materials than in 1920-29 is to be expected in the next ten years, and he points out that unless adequate transport facilities are available, the British Colonies will not enjoy their share of this

See "Publications Received" notice on page 321

XUM

expansion. Most lines that carry such materials to the ports are single, and he questions their ability to handle a further increase of tonnage sufficient to provide even the £5,600,000 increase in gross revenue recorded between 1919 and 1929. During that period 2,100 miles of new line were required to open up undeveloped areas in the Colonies; the question of corresponding future expansion is considered in some detail with the aid of the following informative table:—

Colony	Area in sq. miles	Population	Foreign Trade in 1937	Railway Route-Mileage	Population per mile of Line
			£		
Nigeria	372,599	20,476,795	33,682,000	1,903	10,760
Gold Coast	91,843	3,617,126	24,343,000	500	7,234
Kenya & Uganda ...	318,941	7,045,685	18,959,000	1,625	4,336
Tanganyika	360,000	5,225,436	8,367,000	1,376	3,798
Ceylon	25,332	5,306,871	41,394,000	951	5,580
Malaya	51,333	5,173,992	—	1,068	4,843

Various proposed lines in the different Colonies are discussed in detail, and, in summarising their prospects, the author wisely reminds his readers that no proposal for an extension should be finally rejected because it cannot be proved to be directly remunerative, until indirect benefits to the Colony concerned have also been considered. The long view should be taken, and lack of existing or recent construction programmes should not lead to the belief that extensions are not needed. The Colonies must be in a position to take immediate advantage of all reasonable future demands for raw materials by being prepared and in a position not only to produce but also to transport them without delay. It is now agreed that after the war there must be "freedom from want"; and the implementation of that peace aim will, apart altogether from the great though temporary demand for purposes of reconstruction, provide a permanent demand for the products of colonial industry.

Another Poor Argentine Railway Year

THE close of the financial year ended June 30, 1941, makes it possible to estimate the position of the foreign-owned lines in Argentina, as shown by the aggregate returns on the year's working. The figures, which are only approximate and subject to adjustment, are an eloquent index of the discouraging situation of the companies. Apart from those of the B.A.P.R., the aggregate receipts for 1940–41 compare very unfavourably even with those for 1939–40, itself an extremely poor year from the revenue-earning standpoint. Comparing the working results of the four broad-gauge lines during the two periods, the position is as under :—

	Increase or decrease in 1940 compared with 1939 (pesos)	Increase or decrease in 1941 compared with 1940 (pesos)
B.A.G.S.R.	− 572,000	− 3,337,000
C.A.R.	− 11,965,250	− 4,511,300
B.A.W.R.	+ 1,482,000	+ 1,067,000
B.A.P.R.	− 3,871,000	+ 3,985,000

Depressing as these results are, it is some consolation to record a slight but steady improvement during the last quarter of the 1940–41 period. Since the end of March, the B.A.G.S.R. has reduced its adverse balance of 4,000,000 pesos; the C.A.R. has improved its position to the extent of 4½ millions; the B.A.W.R. has converted a deficit of $1,267,000 into a gain of $1,067,000, while in the case of the B.A.P.R. a small increase at the end of March of $78,000 has expanded by the end of June to almost 4 millions. Although these recent increases are encouraging, it would be erroneous to interpret them as a sign that the tide has turned and that the railway situation is definitely on the mend. What little ground has been recovered during the last three months of the 1940–41 period is due mainly to a heavier grain movement after months of almost total paralysis of cereal traffic, but owing to the European situation there is no certainty that this augmented movement will be maintained at its present level. Nevertheless, the fact that since July 1 most of the lines have been showing an improvement in their weekly returns is a hopeful augury for 1941–42. In the appended table the aggregate returns of the four broad gauge lines during 1940–41 are compared with the corresponding averages during the quinquennial periods 1926-30 and 1931-35, respectively :—

	Approx. receipts to June 28, 1941	Corresponding average 1926–30	Corresponding average 1931–35	Increase or decrease in 1941 compared with 1926–30	Increase or decrease in 1941 compared with 1931–35
	(In thousands of paper pesos)				
B.A.G.S.R. ...	115,881	144,818	119,935	− 28,937	− 4,054
C.A.R.	85,989	142,204	109,771	− 56,215	− 23,782
B.A.W.R. ...	41,528	54,762	40,853	− 13,234	+ 675
B.A.P.R. ...	75,233	93,308	71,806	− 18,075	+ 3,427

According to the Buenos Aires correspondent of *The Times*, the Argentine railway companies and the two Argentine railway workers' unions (La Fraternidad and La Union Ferroviaria) have recently sent notes to the Minister of Public Works drawing attention to the difficulties of the railways. Both notes lay stress on the enormous exchange losses which have prevented the ordinary shareholders from receiving any dividend since 1930 and have injured railway credit and the ability to renew equipment. It has also led to retentions, under the Presidential Award of 1934, from salaries and wages until conditions improve. Other branches of activity, which could not be carried out without railway services, have received aid from Government exchange profits, and it is urged that these profits should be used to help the railways.

Steam and Diesel Comparisons

AS long as the locomotive is retained as the principal railway motive power unit, there will probably always be contention as to whether steam or diesel is the best form of decentralised power unit. So many factors enter into any attempt to supersede one by the other that not even general lines can be laid down, except perhaps that for diesels a mileage which is high relative to that performed by steam locomotives is necessary in order to offset the high capital cost. No type of diesel locomotive above 1,000 b.h.p. which is in regular service has any other form of transmission than electric, but this has disadvantages of cost and weight and bulk which help to retard the application of diesel propulsion to fast and heavy main-line service. Comparisons between diesel and steam are scarcely feasible on a horsepower basis, and the two types can only be matched on terms of equivalent traffic performance. Taking locomotives as nearly as possible similar in service capacity, it is generally found that the steam locomotive has the higher available power between about 28 and 80 per cent. of the top designed speed, and that the diesel is the more powerful during starting and low-speed accelerating periods and at the top end of the speed scale. But frequently there is a limit to the use which the diesel-electric can make of its extra potential power at low speeds, for the heavy currents cause heating of the electrical equipment, and, in general, the output up to 25/28 per cent. of the top speed must be limited to that within the continuous rating of the traction motors. Water and fuel costs, availability, lower track stresses, reduction in coaling and watering stops are all matters which vary in degree very widely between one railway and another, and yet in certain examples may virtually be set at nought owing to an urgent desire to eliminate the smoke nuisance and improve general working conditions over a mountain line with numerous tunnels, as on the Campina—Brassov section of the Roumanian State Railways, where a 4,400 b.h.p. diesel locomotive was set to work in 1938. The thermal efficiency of a diesel is three or four times that of a modern steam locomotive, and Mr. E. E. Chapman, of the Aitchison, Topeka & Santa Fe Railway, in a paper to the American Society of Mechanical Engineers gave that of the diesel as 26 to 28 per cent. at the drawbar as against 6 to 8 per cent. for main-line steam engines. The lower fuel consumption of the diesel is partly offset by a higher unit cost, so that the fuel bill may be about half that of a steam locomotive. But only in rare instances does the fuel bill of a diesel locomotive exceed 15 per cent. of the gross operating charges. In areas where unlimited quantities of good locomotive coal are available at a low price and with a short haul, the above comparison may not hold. Again, railways which are close to oil fields that can supply quantities of low-grade residue may not be able to justify the use of a high-grade diesel oil. Finally, in localities where any fuel is scarce the diesel may be justified by saving in transportation charges, owing to the smaller quantity required.

PUBLICATIONS RECEIVED

Colonial Railways, 1929-1938 ; an Economic Review. By John Wyatt Spiller, C.M.G., M.Inst.C.E. Excerpt Journal of the Institution of Civil Engineers, Session 1940-1941. London : Published by the institution, Great George Street, S.W.1. 8½ in. × 5½ in. 88 pp. Paper covers.—This review is the subject of an editorial article at page 319.

The British Engineers' Association Classified Handbook of Members and their Manufactures, 1941 Edition. London : The British Engineers' Association, 32, Victoria Street, S.W.1. 8½ in. × 5½ in. 447 pp. Paper covers.—The 1941 edition of the handbook is now in circulation, and some 5,500 copies are in course of distribution at home and overseas. The object of the handbook is to establish a closer contact between buyers overseas and the engineering firms which are members of the British Engineers' Association. The compilers of the handbook realise that during the war the circulation of the handbook cannot be followed by the usual flow of orders, but they regard this as a temporary phase, and the handbook will serve a useful part in enabling men of vision to prepare for the restoration of peace and the resumption of the forward march of trade both along old routes, and also new roads which will have to be opened up.

Hydraulic Remote Controls.—In a folder published by the Exactor Control Co. Ltd., two new transmitter units are briefly described. Type " M " is a development of the standard Exactor transmitter, and, apart from other minor improvements, the main advantage is the introduction of an increased reservoir capacity, so that the intervals between topping-up (the only routine maintenance required) are correspondingly lengthened. This unit serves for loads up to 120 in.-lb. over distances up to 150 ft. For the operation of lightly loaded mechanisms there is Type " T," and while this has been designed primarily for the control of constant speed airscrews, it can obviously be adapted to cover a whole new field of remote control problems. Maximum load in this case is 30 in.-lb. over distances up to 30 ft.

THE SCRAP HEAP

47 FREE TRIPS

When a man was fined £1 or 14 days at Kingston recently for travelling on the railway without paying his fare a detective said he had been convicted 47 times for similar offences.

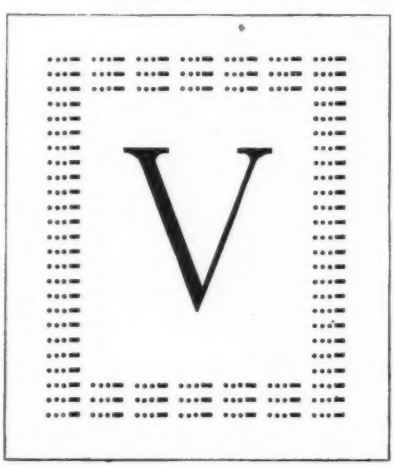
* * *

FORGED RAIL TICKETS

Widespread forgery of railway tickets by Servicemen, particularly in the Navy, was mentioned at Portsmouth court recently when a man was fined £4 with three guineas costs for travelling on the railway without paying his fare and altering a railway ticket. A railway detective said he had made checks at Havant, and on one occasion stopped 12 sailors, all of whom were using forged tickets. On another train when a check was made every Serviceman had a forged ticket.

* * *

An official notice has been published in *The Glasgow Herald* stating that the Board of Trade has communicated with the railway company concerned as to the disposal of new and second-hand clothing coming within the rationing arrangements in connection with salvage goods and lost property. It is pointed out that coupons are required for all new goods which are included in the Clothing Rationing Order and that second-hand goods may be sold coupon-free only if they do not exceed certain prices. It is added that intending buyers should make themselves conversant with the Rationing of Clothes Orders and Amendment, as the auctioneers will not consider the sale complete unless the requisite number of coupons is handed over before delivery of the goods.



"81 *Vs for Victory*," *a design sent us by Mr. P. H. Jackson*

* * *

CITY GIRLS CALLED " CHEATS "

Several passengers, for the most part girls and typists employed in the City, were summoned at the Mansion House recently for evading payment of fares on the tubes. Alderman Sir Harry Twyford said these cases seemed to be alarmingly on the increase.

A certain type of young person appeared to think nothing of swindling the railways and was probably unaware that whether the amount was substantial or only a penny or two it might cost 40s. A little publicity seemed to him the only way of bringing this home to those who were not ashamed to pick the pockets of the railway authorities. He suggested the London Passenger Transport Board should exhibit posters at the principal stations pointing out what these cheats were liable to.—*From " The Star."*

* * *

THE SIGNAL SHOWS THE MAN

The electric repeater is a good disciplinarian. It introduces a *regularity* in the character of the signals which is otherwise frequently absent. Let the early traveller notice the signals at the different stations as he passes along. Here he will see one standing well out, fully at danger ; there another with an inclination towards caution, ashamed, as it were, to look the driver in the face.

The manner in which a signal is made to deliver its message is a very good indication of the character of the man who works it. If it comes well to danger and again falls well to clear or caution, it is well attended, and shows a desire on the part of the man who works it to carry out his duties well and faithfully. A slovenly man is too lazy to attend to the adjustment of his wire until he is obliged to do so ; but let him have before him a monitor which says to him " Your signal is not on," when he has contented himself with throwing his lever over to danger, and his responsibility is too great for him to disregard it.—*From " The Application of Electricity to Railway Working," by W. E. Langdon, Telegraph Superintendent of the London & South Western, and later of the Midland Railway. Edition of* 1877.

XUM

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

INDIA

Conversion of N.W.R. 2-10-0s to Coal-burning

The 30 "N" class 2-10-0 four-cylinder goods engines, built by the North British Locomotive Co. Ltd., originally for the G.I.P.R. but transferred to the N.W.R. when the main lines near Bombay were electrified, are to be converted from oil- to coal-burning. This move has, presumably, been necessitated by restricted tanker tonnage. As however these engines have very large fireboxes, it has been decided to equip them with mechanical stokers, to be ordered from America [as recorded in our Contracts & Tenders columns.—ED., *R.G.*].

N.W.R. 0-8-0s to be Converted to 2-8-2s

In 1929 three powerful 0-8-0 tender engines were delivered to the N.W.R. for shunting purposes. One of them has subsequently been tried on the Bolan Pass 1 in 25 grades towards Quetta, without, however, any marked success. The three engines are now to be converted from 0-8-0's to 2-8-2's and their boiler pressures reduced from 180 to 160 lb. per sq. in.

The "W L" Class 4-6-2's in Service

The four "W L" class—intermediate between the "X A" and "X B"—4-6-2 locomotives built by the Vulcan Foundry Limited in 1940 and allotted to the N.W.R., are now working goods trains on the main line between Lala Musa and Peshawar, where there are long 1 in 100 grades. This is in order to run them in prior to their being put into mail and passenger working. So far they are giving complete satisfaction, and are, no doubt, benefiting by experience gained with the "X" class engines. [The "W L" class was illustrated and described in our issue of July 26, 1940, and has axle loads limited to 16 tons on the coupled axles and 16·5 tons on the carrying axles, but develops 25,530-lb. tractive effort at 85 per cent. boiler pressure. On page 336 we illustrate one of these engines at the head of a goods train leaving Rawalpindi for Peshawar.—ED., *R.G.*]

ARGENTINA

Government and the Wage Cuts

After a series of lightning strikes organised by some of the outdoor and workshops staff of the B.A.G.S.R. as a protest against the continuance of the wage cuts and the company's action in increasing these from 3 to 5 per cent.—in accordance with the Presidential Award of 1934, which authorised this procedure when the financial situation demanded it—the Argentine Minister of Public Works called a conference of the representatives of the railways and the labour unions for the purpose of discussing the question. The Minister stated that the Government was seriously concerned about the financial position of the railways, as a result of the decline in the receipts and the enhanced cost of fuel and other materials. At the same time the Government recognised that the interests of the men had also to be considered, and it was, therefore, essential that a solution to the problem, which would enable the companies to reduce their working expenses while avoiding other difficulties, should be found as quickly as possible. The Government was of the opinion that this could be achieved through the medium of frank and amicable discussion between the parties concerned, and to this end it intended to co-operate with all the means at its disposal.

The companies' point of view was then expounded by Dr. G. E. Leguizamon, Chairman of the Local Boards of the B.A.G.S.R. and B.A.W.R., who stated the difficulties under which all the railways were at present operating, and stressed the urgency for finding a solution to this problem of a vital public service.

After the unions' representatives had stated their case, the Minister asked those present to arrange to hold meetings at which the various problems involved could be discussed, with a view to submitting their joint proposals to the Government.

For a long time the railway employees have been pressing for the repeal of the Presidential Award in regard to the wage cuts, and some two years ago the Chamber of Deputies voted for its cancellation and the reimbursement of the sums deducted. A Government committee of investigation was appointed, but its findings have not yet been made public.

Argentine-Bolivian Construction

A Bill soliciting legislative sanction for the treaty concluded in February last between Argentina and Bolivia, providing for the construction of an international railway from Yacuiba to Santa Cruz de la Sierra and Sucre, has been sent to Congress by the Argentine Government. Under the terms of the treaty, this Government undertakes to advance the sum of $12,200,000 to the Bolivian Government for the construction of the first section of the line from Yacuiba to Villa Montes, and an additional sum of 2,000,000 pesos for oil-boring and prospecting operations in the Sanandita petroleum zone. It is also proposed to lay an oil pipe-line from the Bolivian oilfields at Bermejo to the nearest station on the C.N.A. (State) Railway, for which a further sum of $800,000 has been allocated. The necessary funds will be obtained by means of an issue of national bonds; details of this scheme were published in THE RAILWAY GAZETTE of June 14, 1940, April 4, 1941, and May 9, 1941.

BRAZIL

Rio Grande do Sul Railway

The Rio Grande do Sul Railway, which belongs to the Federal Government but is leased to the State of which it bears the name, has a route-mileage of 2,110 miles. Its administration is much concerned with the results of bus competition, but the introduction of 23 streamline petrol railcars has met with considerable success in retrieving traffic. These railcars have been built in the railway workshops and each seats 42 passengers and has a small baggage compartment; the power unit is in some cases a 90-h.p. and in others a 120-h.p. motor.

Due to the great difficulty in obtaining new rails the engineers are now cropping 11 13/16 in. from each end of the rails suffering from wear and batter at the joints. As this is an expensive and unsatisfactory expedient, a deputation of engineers is visiting the U.S.A. with a view to ordering a butt welding plant and also any additional rails that can be made available. Only 50 per cent. of the railway's tracks are ballasted and other cheeseparing practices during construction are now proving very costly in maintenance.

CHINA

Recent Constructions in Japanese-occupied China

In addition to the Shihchiachwang—Tehchow line—which 125-mile line was, incidentally, constructed between June 15 and November 15, 1940—and the Taiyuan-Luan railway—officially opened on March 15 last—two other short lines have recently been built in the area controlled by the Japanese North China Railway. They are (1) an extension of the Linchen–Taierchwang branch to join up with the Lung-Hai Railway at Chaotung. This 20-mile extension was completed on April 4, 1940. And (2) the Poshan-Patow light railway, a six-mile line in Shantung Province. It was completed on February 10, 1941.

SPAIN

Orient Express Sleeping Cars

The International Sleeping Car Company has been authorised by the Spanish authorities to introduce into Spain 40 sleeping and other cars previously in use on the Orient Express, and now redundant. The coaches will be converted to the 5 ft. 6 in. Spanish gauge by lengthening the cross girders of the bogies and fitting new axles; new drawgear and buffers will also be fitted. The cars are 23·45 metres (76 ft. 11 in.) in length, and are fitted with 16 berths, in four double and eight single compartments. Of the 40 vehicles, 24 are sleeping cars, 10 restaurant cars, and 6 luggage and brake vans. It is expected they will be ready for service in about four to six months, and they will be used on the Sud and other principal expresses between Madrid and Seville and Barcelona.

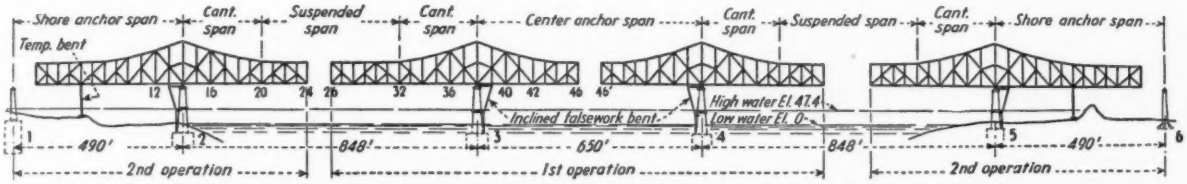
New Mississippi Combined Rail and Road Bridge

Near Baton Rouge, a five-main-span cantilever bridge has been erected by balancing, without false work, on piers built upon caissons sunk 180 ft. below low water level. It cost about £2,350,000

HITHERTO there has been no bridge over the Mississippi river between the Southern Pacific one near New Orleans and Natchez, a distance of 180 miles; a new combined rail and road bridge has, however, recently been completed five miles above Baton Rouge, roughly half way between the two existing bridges. Formerly, the Louisiana & Arkansas Railroad crossed the river by means of a train ferry about 40 miles above the new bridge, and ran over its own tracks along the east bank of the river thence to Baton Rouge. The new bridge has enabled the railway to abandon this ferry, and the 45 miles of line on the east bank have become a branch line. Main line trains now run over the Texas & Pacific line down the west bank of the river to the new bridge, by which they reach Baton Rouge; the L. & A. follows the east bank of the river thence to New Orleans. The new bridge also replaces a ferry on U.S. Highway 190.

As well as being centrally situated between the older bridges, the new structure spans the river at a particularly narrow reach. Also, the site has the advantage of being above the limit of deep-draught navigation, so that a clear headway for shipping of only 65 ft. is necessary, as compared with 135 ft. anywhere lower down the river.

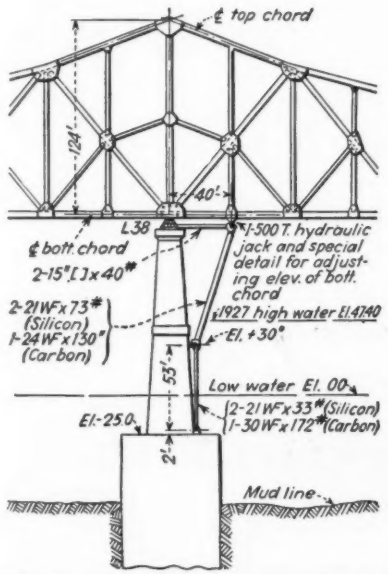
The bridge carries the railway between its main trusses, the centres of which are 32 ft. apart, and a 20-ft. one-way roadway is cantilevered out on each side of the five main spans. These consist of two 490-ft. anchor spans, one on each bank of the river, two cantilever spans each of 848 ft., each containing a 396 ft. suspended section, and a central 650 ft. anchor span between them. The depths of the trusses vary from 124 ft. over the piers to 62 ft. at the centres of the spans. The railway approaches take the form of steel trestle viaducts, in which 83-ft. deck plate girder spans alternate with 43-ft. spans on steel towers; the eastern approach is 3,586 ft. in length and is graded at 1 in 88½, and the western is 5,298 ft. and at 1 in 80. The highway approaches are 835 ft. and 1,713 ft. in length and have 1 in 20 gradients. They are of generally similar construction to the railway approach viaducts.



Elevation of main river crossing of Baton Rouge bridge, showing stages in the balanced-cantilever erection scheme, which requires no falsework in the river

The two central pier caissons were founded upon sand islands and sunk to the great depth of 180 ft. below low water level; the caissons of the other four main piers were sunk by open dredging.

As 80-ft. depths of water are encountered at this site even at low water, and as the river bed is of soft mud, it was decided



Details of the inclined falsework bent which supported steelwork for entire balanced cantilever erection over main piers

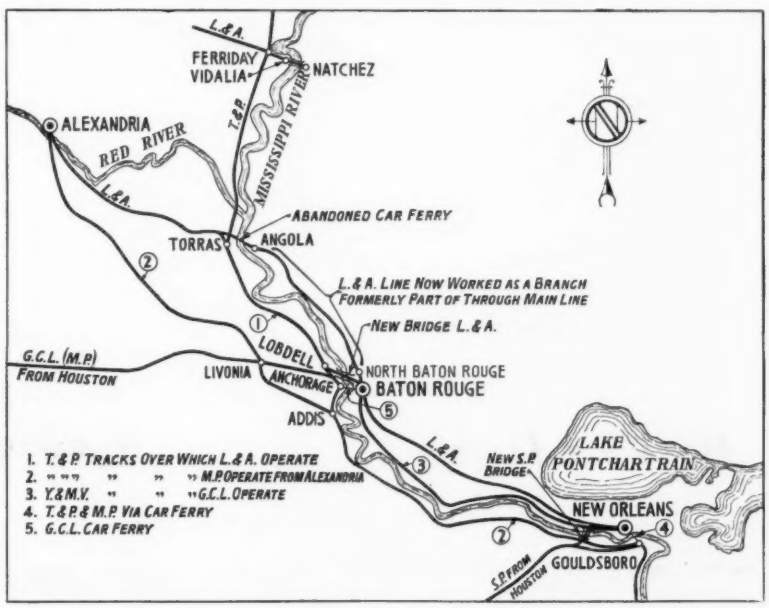


Diagram showing the position of the new bridge and the various railways in the neighbourhood

XUM

to erect the superstructure with no falsework beyond an inclined steel bent acting as a strut from each of the four central piers to support the first truss panel, 40 ft. long, in each truss, and so provide a platform for the erection derricks. Erection then proceeded by balancing the steelwork in the trusses on the two sides of each pier, a method that proved rapid and economical. Some of the members that had to be lifted weighed up to 42 tons, and 8-in. × 1-in. rivets had to be used for some of the field riveting. Erection was effected in two stages: (1) the simultaneous balanced cantilevering over the two central piers and the joining up of the central anchor span between them, leaving a cantilevered arm and one half of a suspended span cantilevered in opposite directions from these piers. Stage 2 entailed similar erection over the two intermediate piers, carrying the shore anchor spans to the outermost main piers or pier-abutments. To insure safe and meticulous erection accurate balance calculations were necessary. The falsework bents and bracing were designed to resist an unbalanced moment due to a load of 100 tons at the end of either arm at any time during erection. A 500-ton hydraulic jack on each falsework bent regulated the elevation of the bottom chord of each truss. Actually, the half span arms of the centre anchor span were kept slightly raised above the horizontal by these jacks to insure easy closing of the top and bottom chords. Also in stage 2, temporary supporting bents on the river banks carried the shoreward anchor arms, and two 200-ton wedge jacks and one 350-ton hydraulic jack under each of these bents assisted in the accurate lowering of the trusses on to the pier-abutments.

The total weight of fabricated steel in the main spans and approach superstructure is about 35,000 tons, of which some 20,000 tons are in the main spans. The overall length of the railway bridge including steel viaduct approaches is just 2¼ miles. The total cost of the bridge including approaches is about $9,500,000, according to our American contemporary *Engineering News-Record* from which the above brief details and diagrams have been extracted. The map shows the new bridge and L. & A. and other railways in the area.

Manila Road Transport

The highway motor transport system owned and operated by the Manila Railroad Company showing operating revenues for the year ended June 30, 1940, of P.1,598,185, an increase of P.140,412 over the preceding period. Expenditure, including depreciation, amounted to P.1,263,641, an increase of P.114,520. The system includes the Benguet Auto Line, the Luzon Bus Line, and the Mindanao Motor Line; the last-named was inaugurated on July 12, 1939, with 66 vehicles acquired from the former Cotabato Valley Transportation Co. Inc. The equipment at the end of June, 1940, totalled 263 units, including 14 motorcars, 183 passenger buses, and 66 freight and express lorries. A total of 1,422,914 passengers was carried over all routes, an increase of 43,294 over the previous year. Freight and express traffic totalled 52,693 tons, a decrease of 6·44 per cent.; revenues, however, were higher by reason of the increased length of haul. The Luzon Bus Line was extended considerably during the period by the establishment of new routes. Valuable service was given by the buses during interruptions to railway operation through flood damage on three occasions during November and December, 1939.

Above: New large-capacity cab-over-engine bus of the Luzon bus line, parked near the Manila hotel

Below: Units of the Mindanao motor line in actual service on various routes in Cotabato, Lanao, and Oriental Misamis provinces, Mindanao

OUR EASTERN APPROACH TO PERSIA (IRAN)

Briefly describing the extraordinary railway from Quetta to Duzdap, the terminus near the point where the Indian, Persian, and Afghan frontiers meet

IN the early years of the century a 5 ft. 6 in. gauge railway was built from Spezand junction, near Quetta, to Nushki in tribal Baluchistan. This line runs in a generally south-westerly direction, is 83 miles in length, and passes through Mustang Road whence a motor road strikes southwards to Kalat. Quetta and Spezand are situated about 5,500 ft. above sea level, whereas Nushki is only 3,341 ft., and the last 10 or 12 miles of the line into that town fall on a continuous gradient of 1 in 50; 10-deg. (573-ft. radius) curves are freely used on this mountain section.

It is probably not generally known that during the last war one of the fronts on which we conducted operations was in Eastern Persia (Iran). In order to prevent enemy infiltration into Afghanistan, the British and Russians maintained what was known as the East Persian Cordon which " policed " the whole tract of country from the Caspian Sea to the Persian Gulf. The British part of the cordon stretched from the gulf up to Birjand, and the force employed was roughly the equivalent of an Indian brigade with cavalry and mountain artillery. It was based on Quetta, and Nushki, as the nearest railhead to these operations—which involved some fighting with German influenced, financed, and armed Persian and Afghan bands—became an important advanced base. The main difficulty connected with this force was its lines of communications, which were no less than 700 miles in length, and beyond Nushki the only means of transport was by camel, as the country is all *dasht* or stony desert.

In 1915-16 an outbreak of disease swept away 30,000 camels, and the question of transport became critical. It was said—with some exaggeration—that you could find your way throughout the 600 miles by the dead camels, so thickly were they strewn along the track. This track was just passable for light motor vehicles, but the numbers of them available and the condition of the " road " caused the Government to decide to extend the railway westwards from Nushki to the Persian frontier. In passing, it may be noted that, although our East Persian force was left with its right flank in the air when Russia collapsed, we continued to maintain it until the end of the war.

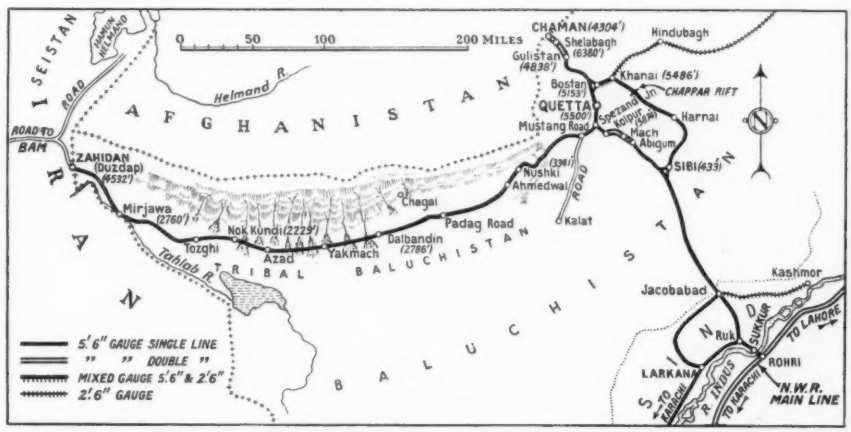
The Extension beyond Nushki

In August, 1916, a survey party took the field at Nushki and was quickly followed by a construction force, all the labour for which had to be brought from India proper, as there was practically no population locally. Construction was pushed ahead so rapidly that by about the New Year, Dalbandin (115 miles from Nushki) had been reached. Here there was a large military post and a good water supply piped from the neighbouring hills; consequently a halt was called and construction work was not continued until the following autumn or winter, but the survey was pushed ahead another 104 miles to Nok Kundi.

The country as far as Dalbandin had been easy and there was an occasional small village but almost negligible cultivation. Water was, however, very scarce and totally inadequate for railway purposes. Until Dalbandin was reached every drop required for the construction labour and for locomotive and other purposes had to be carried in tank wagons, with the result that the construction trains consisted of about equal numbers of material trucks and water tanks. Earthwork was very light, and, as there is practically no rainfall in those parts, bridges were of the Irish or causeway type situated in " dips " in the grading.

From Dalbandin Onwards

Beyond Dalbandin, however, there was not a habitation and practically no vegetation all the way to Nok Kundi. Long stretches of *dasht* covered with black stones, were broken by stretches of coarse sand or of *pat* (pronounced to rhyme with but). Climatically this area is most unpleasant. For eight months of the year there is intense heat and the notorious " 120-days wind "—which actually blows almost unceasingly for about five months—lashes the coarse sand so that it literally cuts the skin like a sand blast. The survey party had to depend upon camel transport for water and everything else, and water had to be carried anything up to 40 miles. When it was obtainable it was often from a filthy pool, and, as the whole country was coated in sulphur, the water was, in fact, a concentrated solution of common and Epsom salts mixed. It was possible to pick up a lump of sulphur haphazard from the ground so pure that, if burnt, ash sufficient only to cover a sixpence was left.



Sketch map showing the railway from Quetta to the Persian frontier at Zahidan (Duzdap) and connecting lines

The line throughout runs parallel to and from 5 to 25 miles distant from the foot of a range of mountains, which is followed by the Baluch-Afghan frontier. The railway was, therefore, subject to raids from Afghan tribesmen, and Nok Kundi rest-house was in ruins as a result of such a raid when the survey party reached it.

When there is any rain, the year's fall may occur in a few hours. There are rivers debouching from these mountains, but they are dry except after this infrequent rainfall. When they do flow, however, they have sufficient volume to wash down much stone from the hills, which spreads out fanwise over the *dasht*. The railway runs across these " fans " and allowance has to be made to pass the water, when it does flow, under or over the track. But instead of the bridges being in valleys, they have to be on or near the summits of switchbacks, as the streams flow along the crests of the " fans." In practice there are Irish bridges or " dips."

Another curious feature in this area are the *do-reg* or marching sandhills. These are formed by the wind into an elongated crescent shape and are constantly on the move in regiments. As the prevailing wind is athwart the general direction of the line, it follows that the latter has to be moved from time to time to avoid several thousand tons of sand advancing upon it in the form of a sandhill from the flank. These *do-reg* move in parallel lines for many miles

XUM

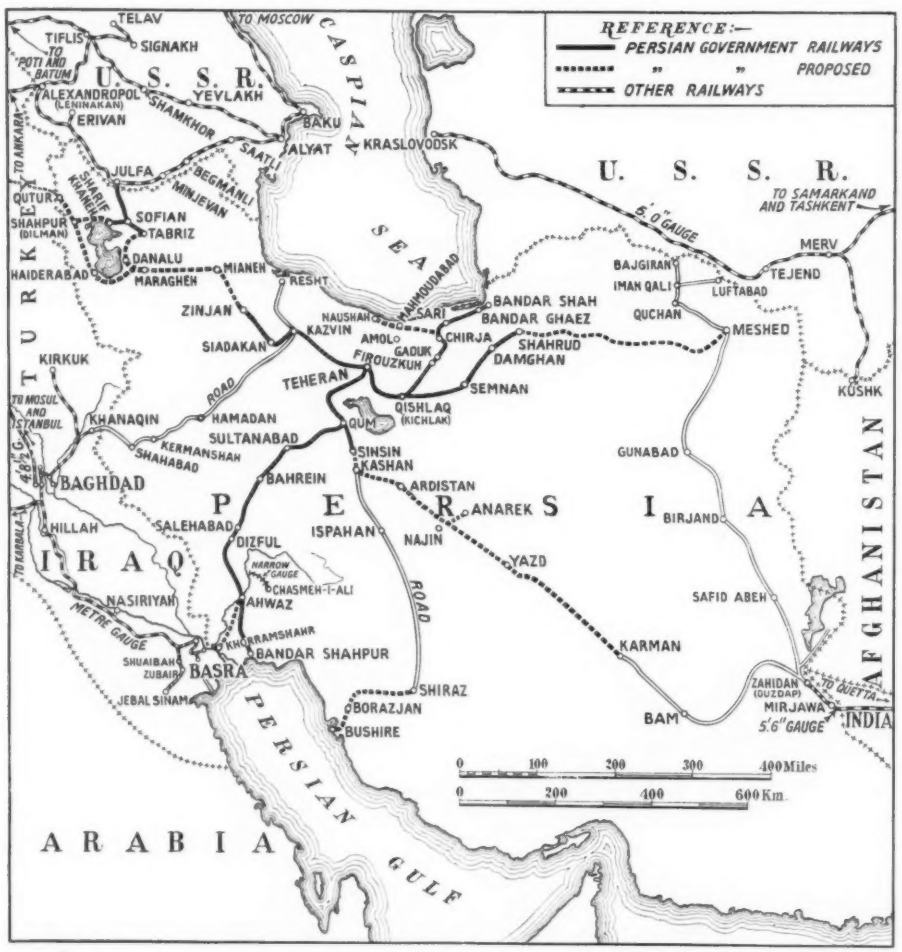
across the *dasht*, but at a speed of only 500-600 ft. annually. Most of the permanent way used on this line initially consisted, up to Dalbandin, of 75-lb. flat-footed rails laid on wrought-iron " pea-pod " or wooden sleepers. The locomotives used at the time of construction were of the well-known " L " class 4-6-0 type, but they have probably been replaced by the more modern " XA " or light 4-6-2 type.

Peacetime Terminus at Nok Kundi

The line was completed to Duzdap (440 miles from Spezand and 357 from Nushki) towards the end of the last war, but it was found during the subsequent years of peace that traffic did not justify its being worked beyond Nok Kundi, which has accordingly been the terminus for a good many years past; we believe the permanent way onwards to Duzdap was left in position and not dismantled, but, in any case, its relaying or rehabilitation could be carried out very rapidly at short notice if necessary. Even to Nok Kundi there has recently been only one train each way a week, and the public traffic offering—mainly caravans to and from Persia—could hardly justify the cost of keeping the line open to that station. Evidently, therefore, the Government considered that its maintenance in working order was essential in case of just such an occasion as exists today. [There is, however, no indication so far that any military forces are being sent to Persia from India by this route, though, from *The Daily Telegraph* of September 25, it would appear that the railway is being rehabilitated, preparatory to the passage of supplies for Russia over it and thence by road *via* Birjand and Meshed to the Trans-Caucasian Railway.] The one train weekly would be required to supply the intermediate permanent way gangs and stations with water and rations, as neither are available locally, and the trains are booked to stop at gang huts to discharge water from their tanks into lineside ground tanks.

It is to be noted that any through traffic resulting from a future extension of the 4 ft. 8½ in. Persian system to meet this line at Duzdap, would have to be transhipped at that point because of the break of gauge to the Indian standard 5 ft. 6 in. It is significant that the Persian Government is at present building a railway from Qum, on the Trans-Persian line, towards Yazd with the obvious intention of continuing it to Karman and possibly Bam in the comparatively near future. To link Bam with Duzdap would be the reasonable sequel, and as the north-western line from Teheran to Tabriz will be completed shortly, there will then be through rail communication from the North Sea to India *via* Russia, Teheran, and Duzdap with three changes of gauge, 4 ft. 8½ in. (western Europe) to 5 ft. Russian; 5 ft. (Russian) to 4 ft. 8½ in. (Persian) at or near Tabriz; and 4 ft. 8½ in. (Persian) to 5 ft. 6 in. (Indian) at Duzdap. A more recent though less well-known name for Duzdap is Zahidan.

Map of the Railways of Persia and Neighbouring Territories



THE RAILWAYS OF PERSIA

A description of the Trans-Persian and other lines completed, building, or projected

THE long seclusion of Persia—or Iran as it was called for a time—and its absence from the map of world trade routes, has been due to its peculiar geographical, or rather topographical, situation. For, though it consists mainly of a great plateau with several open fertile valleys running from east to west, it is hedged about with natural obstacles making ingress from without most difficult. To reach the plateau from north or south, the only directions of approach from a seaboard, the formidable Elburz or the even more fearsome Luristan mountains, have to be crossed, with the result that railways or roads to carry heavy traffic can be constructed only at almost prohibitive cost. To the east there is desert and to the west there are more mountains.

Apart from a short branch line from the Caspian Sea southwards—believed to have been dismantled some years ago—and an extension of the Russian 5-ft. gauge system into the Tabriz area in the north-west, no railway was built in Persian territory before 1927. This seclusion, however, came to an abrupt end with the accession of H.I.M. Risa Shah-Pahlevi, the ruler of Persia who has just abdicated. For, whatever the means he used, the ends he achieved in so far as transport was concerned, were revolutionary. By personal interest both in the general scheme and even in the details of communications throughout the country, he undertook the development of Persia by opening it up first with roads and more recently with standard-gauge railways. The flow of foreign trade into the heart of the country and also across it from south to central Asia and from east to west is thus being encouraged. Unfortunately, Risa Shah-Pahlevi insisted upon financing these new communications from within his dominion at the expense of excessive taxation, which has impoverished the country and made him very unpopular.

The Trans-Persian Railway

The first and most ambitious railway construction work he attempted was the Trans-Persian line from Bandar Shah on the Caspian Sea through Teheran, the capital, to Bandar Shahpur on the Persian Gulf, a distance of 808 miles. Begun in 1927, the construction of the southern section of this trunk line was first entrusted to an American syndicate and that of the northern section to a German firm, with Teheran as the point of demarcation between the two sections. But subsequently the Persian Railway Ministry took over both sections, with the intention of completing them under the guidance of Swedish and American experts. These experts, however, could not agree as to the most suitable ruling gradient, the Swedes urging the use of 1 in 30 and the Americans deeming it unwise to have grades steeper than 1 in 43½. His Majesty finally settled the point by deciding upon a mean of the two, or approximately 1 in 36. Furthermore, a Danish syndicate, the Kampsax Consortium, was appointed to replace the Swedes and Americans, and thereafter controlled the entire construction work on behalf and under the supervision of the Railway Ministry.

Though it was consulted and had the final decision in the methods used for constructing the larger bridges and tunnels, Kampsax left the various firms a free hand in the manner and methods used for all ordinary works on their respective lengths. On the northern section, for instance, almost all known systems of tunnelling were used. On the southern section, however, where no timber was available and had to be imported or brought from long distances, it was stipulated that the Belgian system must be used. The gauge adopted was 4 ft. 8½ in., and the line is single throughout.

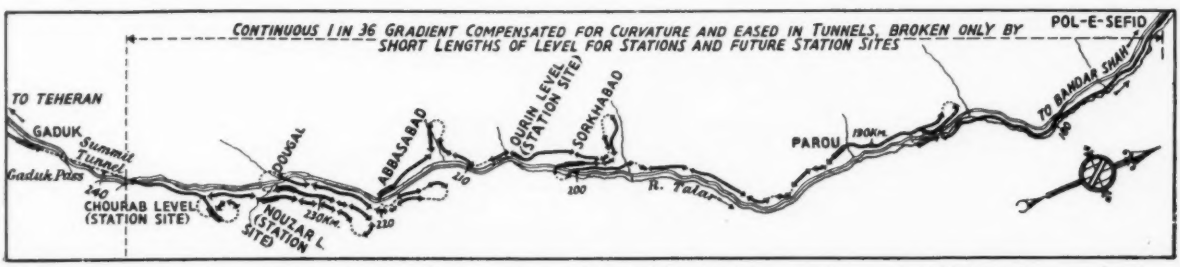
The northern section runs through well-wooded country which supplied the necessary timber for the sleepering of both sections. It was hewn to size in the forests and taken to Chirja where there is a treating plant. In some lengths of line steel sleepers were used as well as wooden, and the Persian Government placed an order valued at 20,000,000 rials (about £270,000) with the Continental Steel Cartel for the former. As will be seen from the gradient profile reproduced, there are besides the 1 in 36 climb in the north, long lengths of line with 1 in 67, 1 in 71, and 1 in 54 ruling grades, but the coastal approaches are comparatively easily graded. There are two main summits, but the greatest continuous rise is that from Chirja, or Chahi, at the foot of the Elburz Mountains to Gaduk, where also is the steepest grade.

The Northern Section

The northern section of the line is considerably the shorter and connects Teheran with the twin and adjoining ports, Bandar Ghaez and Bandar Shah, on the Caspian Sea. From these ports the line runs through fairly level country—the most fruitful part of Persia—in the province of Mazanderan to the foot of the Elburz range. Rice is here the staple crop, but excellent results have also been obtained from experimental plantations of tea, tobacco, American cotton, and other products. Southern Persia requires these products, but hitherto there has been no economical means of transport from Mazanderan to supply its needs, and most of the products of this rich province have hitherto been sold to the Russians.

Beyond Chirja the construction engineers had to face the Savad-Kuh or northern slopes of the Elburz mountains, and a climb of nearly 7,000 ft. is necessary to surmount the watershed at its most suitable pass. This northern escarpment of the Elburz is very abrupt and the average gradient is far too steep for any railway, so that the only means of scaling these heights is by developing length, and this was achieved by ten spirally curved zig-zags. On the upper part of this ascent the bed of the valley followed by the line rises over 5,000 ft. in 22 miles or at an average grade of about 1 in 23. In order to keep the line above the valley bed it was found necessary to develop 19 additional miles of railway—so as to make 41 miles in all—in this distance of 22 miles as the crow flies. And even this length of line was possible only by using 1 in 36 grades in the open and somewhat easier ones in tunnels, allowing level stretches for stations. In several places there are three parallel sections of line on the same hillside, one above the other, and many of the spirals are in tunnel up to a mile in length, so that in spite of the free use of 200-m. (656-ft.) radius curves this line was very costly. Our sketch plan and illustrations give a fair idea of the alignment and the country traversed.

What, perhaps more than anything else, sent up the cost of this part of the construction, and caused greatest



Sketch plan showing spirals on the 1 *in* 36 *ascent from Pol-e-Sefid to Gaduk summit tunnel,* 6,929 *ft. above sea level*

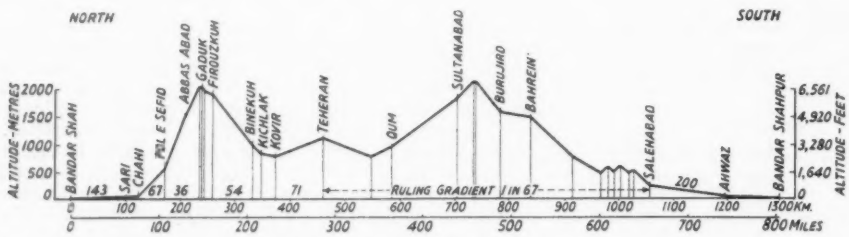
XUM

trouble to the engineers, is the rottenness of the hillsides. This will be appreciated if some of the illustrations are carefully scrutinised. Very heavy retaining walls had to be constructed over long lengths of line, and in some cases where the whole hillside is constantly on the move, tunnelling and retaining wall combined had to be used. In one place it was necessary to construct a concrete tunnel heavily reinforced with rails, to keep the constantly slipping hill slope from obliterating the formation. Moreover, not only had it to be very strongly built, but so steep was the side slope that this tunnel had to be founded upon a retaining wall 80 ft. high. This country is also subject to severe earthquake shocks which tend to make the sidelong ground even less stable than it otherwise would be. Heavy rainfall, too, calls for elaborate drainage and the protection of embankments with hand-packed stone pitching and revetments.

As good quality sandstone is available, whereas cement has, until now, been both costly and of varying quality, most of the bridgework and walling was constructed in good masonry and not in mass concrete. To insure the best possible results Kampsax equipped an up-to-date laboratory for testing all kinds of building materials. The country is rich in various mineral salts, which if not combated suitably, play havoc with construction work in a very short time; hence the importance of the laboratory tests.

The Summit Tunnel

The watershed or lip of the High Persian Plateau is reached at Gaduk where the 8,000 ft. altitude pass is pierced by a tunnel 3,170 yd. in length at a level of 6,929 ft. and there the most difficult portion of the northern section is left behind.



Gradient profile of the Trans-Persian Railway. Note that of the 808-mile total length, over 550 miles (or about 70 per cent.) are subject to ruling grades varying from 1 in 36 to 1 in 71

The southern Elburz slopes lead less steeply down to the inner Persian plateau. The railway follows the Havlahrud valley, noteworthy for its wealth of common salt, and thence in a tunnel under one of the salt mountains into the desert beyond. Near Veramin, where is situated the Czech Skoda sugar factory, the line bends sharply to the right towards Teheran.

The Southern Section

From the construction standpoint the southern ascent from the Persian Gulf to the plateau proved as difficult as the northern ascent, especially the "canyon" section through the Luristan mountains. A description of Contract No. 7, let to the British firm of Richard Costain, Limited, typifies the work there: The primary difficulties of this section lay in its almost complete inaccessibility, precipitous barren terrain, great variations of temperature, and total absence of even paths let alone roads. As well as the great difficulty of making service roads, the eleven British engineers of the firm had to contend with a formidable death-roll among the labour, which was most difficult to obtain and retain on the work. The intense heat also made their own work extremely arduous. The cost of this section of line was estimated at about £1,000,000. Between the tunnels deep ravines and the torrential Ab-I-Cesar river—which the line crosses and recrosses—had to be bridged, and both the service road and railway formation had to be cut out of precipitous gorges and mountain sides where there is always danger of landslides.

Just north of Richard Costain's contract, the Cie. Belge de Chemins de fer et d'Entreprises constructed two ten-mile sections also ranking among the most difficult lengths. The amount of tunnelling was exceptional and comprised, on the first of these sections, 18 tunnels aggregating 6,853 m. (7,495 yd.) and on the second, 20 tunnels totalling 8,331 m. (9,111 yd.) or no less than 41 and 50·5 per cent. of the entire lengths of the respective sections. The most interesting of them are those on the double spiral loop on Contract 10, illustrated, one mile of which had to be tunnelled. The distance between extremities of No. 2 sub-section is 300 m. (328 yd.) as the crow flies, and exactly ten times as much measured along the railway. This double loop is approximately 4 km. (2½ miles) long and enables the line to rise 51 m. (167 ft.).

There are also many remarkable bridges and viaducts, the chief of which are:—

Name of Bridge	Length m. ft.	Maximum height m. ft.
Ab-I-Serum	124 (407)	32 (105)
Ab-I-Cesar	130 (427)	25 (82)
Kechwar	110 (361)	35 (115)
Luristan	100 (328)	33 (108)

It is noteworthy that these are all in a length 10 miles long, which also contributes 5 miles of tunnelling. This contract work was begun in 1935 and completed to the satisfaction of the Persian Government in four months under the three years' contract time. The whole line was formally opened throughout on August 26, 1938, and its estimated cost at completion was placed at about £28,000,000.

Locomotives and Rolling Stock

Some of the most important equipment for this 800-mile trunk line has been supplied by British firms. The 4-8-2 + 2-8-4 Beyer-Garratt locomotives specially designed for working over the 41 miles of 1 in 36 grade were built by Beyer Peacock & Co. Ltd., and this firm also supplied a number of 4-8-0's for the easier graded sections. A large number of wagons were delivered by the Metropolitan-Cammell Carriage & Wagon Co. Ltd., and the Patent Shaft & Axletree Co. Ltd. supplied some of the bridge steelwork.

The Teheran-Tabriz Railway

The next construction undertaken was the western arm of the west to east line across the country. It runs from Teheran through Kazvin, Zinjan, and Mianeh to Tabriz there to link up with the 5 ft. 0 in. gauge line from Julfa having a branch to Sharif Khaneh; though of the Russian gauge, these lines are Persian Government property. The new line from Teheran was opened as far as Kazvin (90 miles) in March, 1940, and to Zinjan (196 miles) on October 4 in that year. Work was, therefore, proceeding rapidly and about 10 miles beyond Zinjan have now been completed; work was done by contract section by section under the Ministry of Communications. The remainder of the line to Tabriz is, however, through much more difficult country, and the highest point on it is at an altitude of 5,900 ft., 2,000 ft. higher than Teheran. Between Mianeh and Tabriz two tunnels each about 650 yd. in length have been completed and work upon several others—including one just over a mile long—is proceeding satisfactorily; nearly 17,000 men are reported to be employed on this line, which conforms to the Persian or standard gauge.

Teheran-Meshed and other Lines

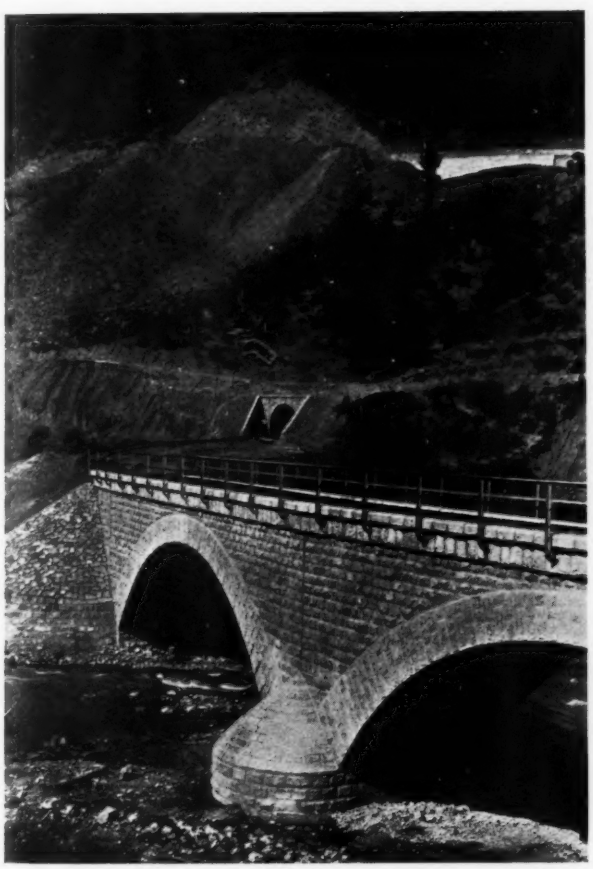
The eastern arm of the west-east line is also in hand and the permanent way has already been laid as far as Shahrud, 448 miles from Teheran. This line takes off the Teheran-Bandar Shah section of the Trans-Persian Railway and runs through Semnan, Damghan, and Shahrud eventually to reach Meshed, in the extreme north-eastern corner of the country and under 80 miles from the U.S.S.R. and about 120 miles from the Afghan frontier, as the map on page 326 shows.

Work upon yet another new line has also begun, namely, one following the important south-eastern trade route from

(*Text concluded on page* 334)

Typical Scenes on the Trans-Persian Railway

Modern station building at Ahwaz. It is replete with circulating hall, comfortable waiting rooms and convenient offices



Arched bridge with portal of spiral tunnel in foreground, and above them a further section of the line beyond the two spirals

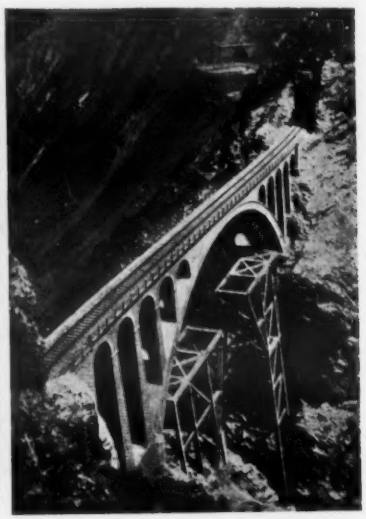
Near the foot of the 1 in 36 incline. Note line to right below and to left above spirals

An example of the rottenness of the hillsides met by resort to heavy and continuous retaining walls over long lengths of line

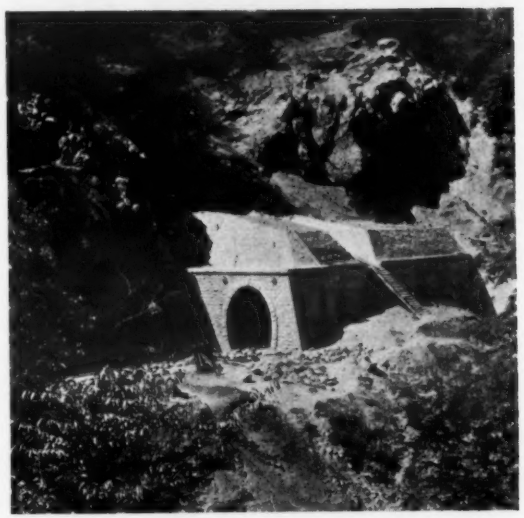
XUM

Scenes on the Trans-Persian Railway

Panoramic view of the three great zigzags by which the line climbs to cross the Elburz mountains in its northern ascent from the Caspian plains to the central Persian tableland. Note the numerous slips on the hillside



Two views of an arch bridge being built across a gorge, as seen from the bottom of the gorge and from the hillside above



One of the galleries built to carry a stream and landslips over the line

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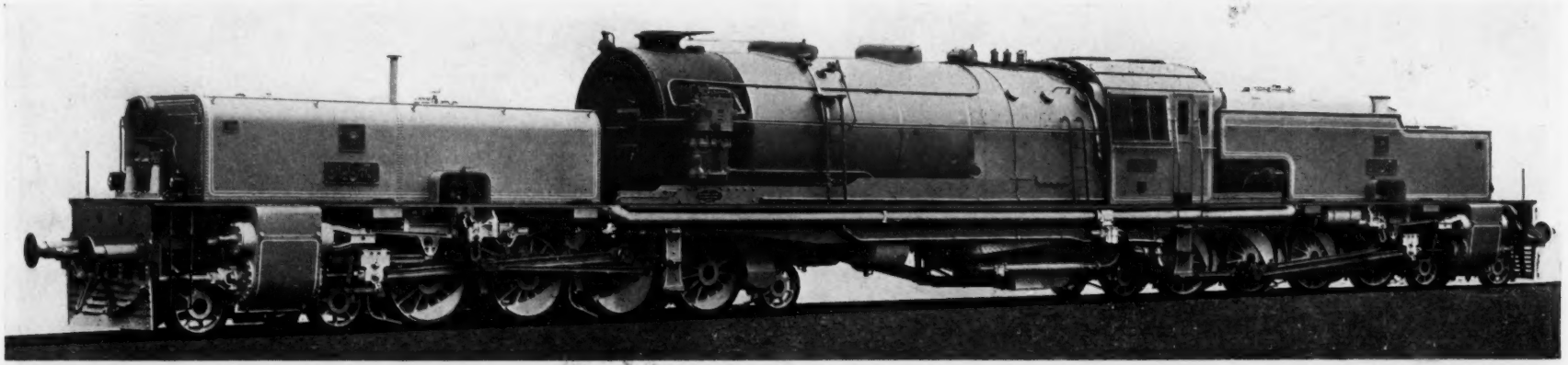
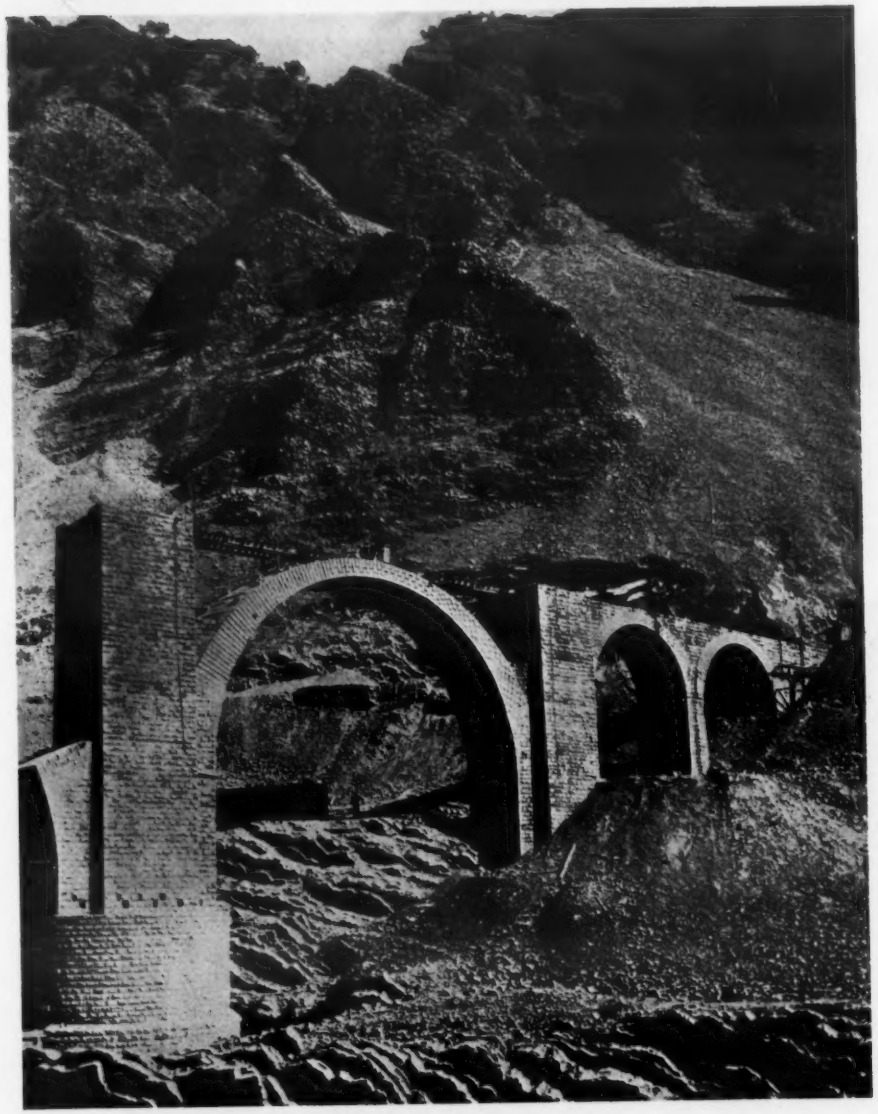
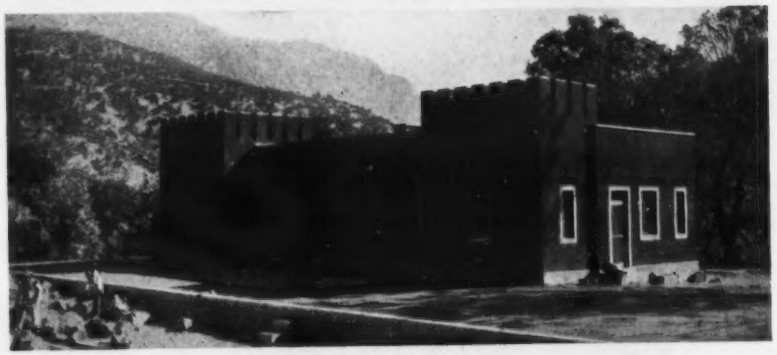
Train at station km. 288, which is 38 km. north of Salehabad, on completion of the section from Bandar Shahpur. The train is all-British built, the locomotive being a Beyer Peacock 2-8-0, and the wagons supplied by the Metropolitan-Cammell Carriage & Wagon Co. Ltd.



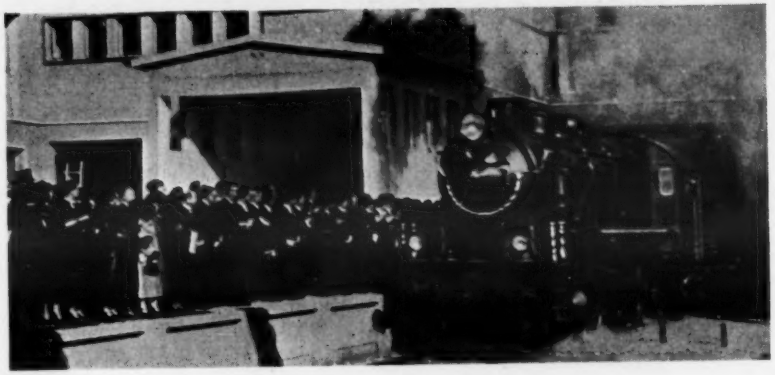
One of the Beyer-Garratt locomotives supplied to the order of the Trans-Persian Railway by Beyer Peacock & Co. Ltd., Gorton, Manchester. Their tractive effort at 75 per cent. boiler pressure is 54,400 lb., and they are designed to haul 400 tons up the 41-mile 1 in 36 grade



A viaduct and typical shale hillside on Costain's length, Luristan



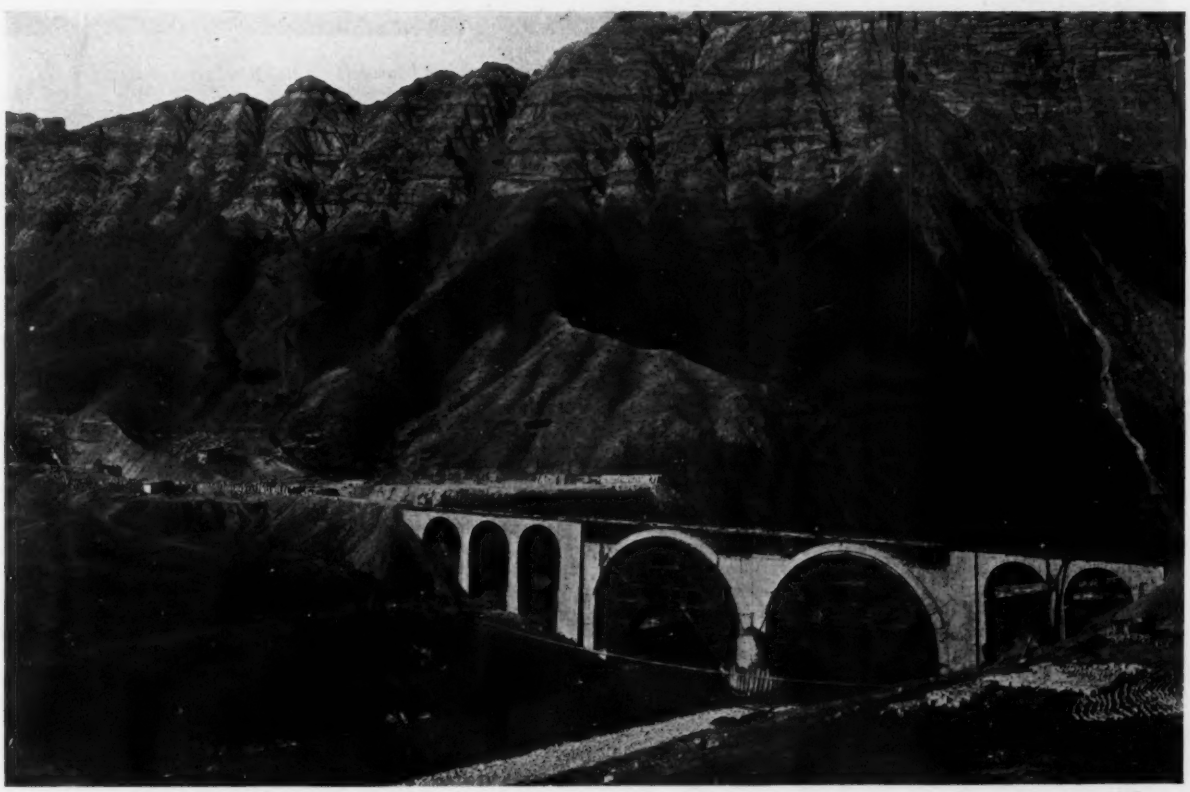
Typical wayside station buildings (upper) Do-Kouh (lower) Zara



The first train entering Teheran station

Bridge Construction on the Southern Section

Bridge under construction at approach to tunnel No. 67



A viaduct being constructed in country typical of the mountain section

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Panoramic view of construction camp on Contract 10, *showing railway and tunnels on two levels in the background*

(*Text concluded from page* 328)

Teheran and Qum to Kashan, Yazd, Karman, and Bam, whence there is a road to Duzdap or Zahidan the original terminus of the 5 ft. 6 in. gauge Indian North Western Railway branch from Quetta. The new line takes off the Trans-Persian trunk line at Qum, but no rails have yet been laid, though earthwork is in hand as far as Yazd. The survey has been completed to Karman. At present there would seem to be insufficient peacetime traffic to warrant a further extension to Duzdap, as the last 100 odd miles of the N.W.R. line from Nok Kundi to Duzdap were abandoned for lack of commercial traffic. Whether the establishment of the through rail route would stimulate international trade and justify the initial outlay is uncertain, but there is the alternative possibility that military requirements may necessitate its construction, in which case the permanent establishment and retention of a railway from Western Europe via Russia and Persia to India would have brighter prospects. At the moment, however, as inferred in the preceding article, it would appear more likely that immediate military requirements will be met by improving the road from Duzdap northwards through Birjand to Meshed and thence over the Russo-Persian frontier to the Tashkent-Merv-Krasnovodsk section of the U.S.S.R. railway system; Krasnovodsk is a port on the eastern shore of the Caspian Sea opposite Baku. The improvement of this road could, according to the Teheran correspondent of *The Daily Telegraph*, be completed ready for supplies to pass freely from India to Russia in about two months.

But if the through railway *via* Karman and Bam to Duzdap is built, there will be three changes of gauge: (1) European to Russian (5 ft.); (2) Russian to Persian (standard 4 ft. 8½ in.), at Tabriz or Julfa on the frontier; and (3) at Duzdap (standard to Indian, 5 ft. 6 in.).

A short length of line is also projected from the port of Bushire, on the Persian Gulf, to Shiraz, more or less closely following the alignment of the narrow gauge line partly built during the last war. This line is expected to be extended later, through Ispahan (Isfahan) to Kashan, there joining the branch from Qum. Both this line and the one through Yazd to Karman will open up some of the best country in Persia and tap rich cities and fertile countryside.

To complete the late Shah's projected railway network, another line will be required to be built westwards to connect with the Iraqi railway system at Khaniqin, but so far as is known no work upon this has yet begun. It seems likely, however, to be an important strategic line and may, therefore, materialise before long.

As a result of the agreement concluded with the new Persian Government, Britain and Russia have obtained control of the Trans-Persian Railway and other vital communications in the country. This will enable supplies for Russia to be forwarded immediately from Bandar Shahpur to central Russia *via* Teheran, Bandar Shah, and the Caspian Sea. But as soon as the Teheran-Tabriz line is completed an even more direct route to the Caucasus will be secured.

A further step towards the immediate reorganisation of the railways has been taken in the appointment of Brigadier-General Sir Godfrey Rhodes, C.B.E., D.S.O., General Manager, Kenya & Uganda Railways & Harbours, as Director of Transport in Persia. General Rhodes, who was born in Canada, had a distinguished service record in France and Salonica in the last war, and in handling railway and harbour problems arising from the transport of large numbers of troops and quantities of materials in connection with the recent East African campaign. He has been General Manager in Kenya and Uganda since 1929 and received the honour of knighthood in 1934.

RAILWAY NEWS SECTION

PERSONAL

Mr. Henry Stephen Frederick Lansdown, Operating Manager (Central Buses), L.P.T.B., who, as recorded in our September 26 issue, has retired, joined the London Road Car Co. Ltd. in 1895 as a clerk in the ticket office. Later he worked in the Accountant's Office and in 1908 when the company was absorbed by the London General Omnibus Co. Ltd., was appointed Cashier. After a period as Chief Clerk to the Chief Engineer, in 1913 he became Operating Superintendent, and in 1921 was made an Officer. In 1932 he was promoted Assistant Operating Manager and when the London Passenger Transport Board was formed in 1933 he became Assistant Operating Manager (Central Buses). In 1935 he was made a Principal Officer and in 1936 was appointed Operating Manager (Central Buses). In this capacity Mr. Lansdown has been responsible for operating a fleet of 4,000 buses running over 250 routes in Central London. Throughout his long service he has played an important part in the development of these routes. He has had 52 garages under his control and there are few of the 25,000 officials, drivers, conductors and other grades, with whom he is not acquainted. In 1939, he was jointly responsible with Mr. Geary for the transport by road of the 200,000 children and other people evacuated from London under the Government scheme. Mr. Lansdown is a foundation member of the Institute of Transport.

Mr. H. S. F. Lansdown

Operating Manager (Central Buses), L.P.T.B., 1936-1941

Mr. S. R. Geary

Appointed Operating Manager (Central Buses), L.P.T.B.

Mr. T. J. Tilston

Appointed Operating Manager, Trams & Trolleybuses, L.P.T.B.

Mr. Stanley Rupert Geary, Operating Manager (Trams & Trolleybuses), L.P.T.B., who, as recorded in our September 26 issue has been appointed Operating Manager (Central Buses), began his career with the London County Council Tramways in 1905. His first appointment was to the Schedules Department, and, after he had gained experience in the General Traffic Office, he was made District Superintendent in 1915. He held in succession the posts of Assistant Divisional Superintendent, Acting Operating Superintendent, and Divisional Superintendent. In 1919 he was appointed Operating Superintendent, and, when the London Passenger Transport Board was established in 1933, he was confirmed in the position. He continued in charge of the former municipal systems until 1934, when the tramways formerly owned by private companies were also placed under his management. In 1936, Mr. Geary was made Operating Manager (Trams & Trolleybuses) and appointed a Principal Officer. During his period as Operating Superintendent and Manager, the London Transport trolleybus system has grown to be the largest in the world. More than 250 route miles of tramways have been converted to trolleybus services, a task which necessitated placing 1,650 new trolleybuses in service and training 3,500 tramway drivers for the new vehicles. Mr. Geary is a member of the Institute of Transport, a Vice-Chairman of the London Safety First Council, and Chairman of the London Tramways Central Athletic Association.

Mr. Tom John Tilston Divisional Superintendent (Southern Division), Trams & Trolleybuses, L.P.T.B., has, as recorded in our September 26 issue, been appointed Operating Manager, Trams & Trolleybuses. Mr. Tilston was educated at the Liverpool Institute, and was appointed to the drawing office of the London County Council Tramways in 1906. From 1907 to 1915 he was engaged chiefly in the preparation of evidence in support of the promotion of Parliamentary Bills for the extension of new tramways in London. He was made Personal Assistant to the Divisional Superintendent (Northern Division) in 1915 and in the next year became District Superintendent, Southern Division. He was appointed Divisional Superintendent (Southern Division) in 1920, and in 1933, when the London Passenger Transport Board was formed, became Divisional Superintendent (Tramways). In 1936 his title was changed to Divisional Superintendent (Trams & Trolleybuses). Mr. Tilston is a member of the Institute of Transport.

We regret to record the death on August 19 in his 80th year of Mr. J. Procter Smith, one time Divisional Accountant (Southern Area), L.N.E.R. Mr. Procter Smith began work in the Traffic Department of the Great Northern Railway in January, 1881, and nine years afterwards was selected for the position of Assistant Auditor in the Boston District. In April, 1896, he was offered a position in the Chief Accountant's office in London, and was subsequently appointed in 1898 as the first Auditor in the Manchester District, with offices at Deansgate. This was an entirely new district which extended to Dublin and Belfast, involving much responsibility and hard

work to organise a proper system of accounting. In June, 1903, Mr. Procter Smith was transferred to the Doncaster District, but in the following January, the Chief Accountant summoned him to London for special work and to organise the stocktaking of the whole line. Mr. Procter Smith was appointed Chief of the Coaching Audit Office in 1905, and in the following year became Audit Assistant Accountant, his appointment as Assistant Accountant being made in 1909. When the amalgamation of railways took place in 1923, he was made Divisional Accountant for the Southern Area, which included the Accounting and Audit Offices of the G.C., G.E. and G.N. Railways. In connection with the reorganisation which followed on this important appointment, very considerable use was made of the official mechanical appliances, this being a matter which had had Mr. Procter Smith's careful attention for some years past, and the result of which proved entirely satisfactory. He retired from the railway in 1928, and was the recipient of many valuable presents, including an ebony and silver tobacco box inscribed "In grateful appreciation of help given and Personal Regard" given by the late Mr. C. Lewis Edwards, Chief Accountant, and a silver cigar box inscribed "As a token of esteem and appreciation of his services as Chairman," presented by the Chief Accountant's Audit Committee. Mr. Procter Smith joined the staff of the British Tabulating Machine Co. Ltd. as Railway Consultant in 1928 and was working in this capacity with the firm at the time of his death.

Mr. W. T. Lakeland has been appointed Chief Engineer of the Yunnan—Burma and Yunnan—Suifu railway constructions, according to *The Commonwealth Engineer*. Mr. Lakeland is a well-known Victorian engineer, who, after working with the Burma Corporation in Burma for some years, volunteered for service in the last war. He was appointed—with the rank of Lieutenant—as Assistant Engineer on the Nushki—Nok Kundi railway survey—described elsewhere in this issue—and afterwards proceeded to Mesopotamia, where he was employed on the military railways. He was Engineer-in-Charge of the building of the Diala bridge and of other important works. Though originally trained as a mining engineer, he has had wide experience of railway survey, construction, and maintenance work, most of it in the East.

Elliott [*& Fry*

The late Mr. J. Procter Smith

Divisional Accountant, Southern Area, L.N.E.R., 1921-1928, and Railway Consultant, British Tabulating Machine Co. Ltd., 1928-1941

Mr. G. S. Maginness, Managing Director of the Churchill Machine Tool Co. Ltd., has been elected Chairman in succession to Mr. Arthur Chamberlain, whose death we recorded in our August 29 issue.

Mr. George S. Gray, of Toronto, has been appointed Deputy Transit Controller in the Canadian Munitions & Supply Department. Mr. Gray will establish headquarters in Montreal with Mr. W. J. Lynch, of Quebec, who was appointed Transit Controller in August.

Mr. Gray has resigned from his position as General Manager of the Canadian Transit Association and Motor Traffic Engineer for the Toronto Transportation Commission and the Grey Coach Lines. Mr. Gray was born at Sault Ste. Marie, Ont., and educated at Meaford, Ont., and the University of Toronto. In the last war he served overseas with the Royal Flying Corps as Flight Lieutenant. He joined the Toronto Transportation in 1920.

One of the transit controller's powers, as recorded in our September 5 issue, at page 243, is to stagger working hours by ordering any employer to arrange or alter hours of employment so that "such proportions as the controller may fix will, as far as possible, arrive at, or depart from, their places of employment at such times as may be directed."

We regret to record the death on September 28 of Mr. Harold Torre, Chief of the Publicity Department of the Central Argentine Railway from 1913 to 1933, and for many years Argentine Correspondent of THE RAILWAY GAZETTE.

INDIAN RAILWAY STAFF CHANGES

Mr. P. S. A. Berridge has been appointed to officiate as Deputy Chief Engineer, Bridges, N.W.R., in place of Mr. S. M. Johnson granted leave as from August. Mr. Berridge's many excellent photos and notes have been published from time to time by us.

One of the "XL" class medium 4-6-2 type locomotives, North Western Railway, India, leaving Rawalpindi for Peshawar at the head of a goods train *(see overseas paragraph, page 322)*

TRANSPORT SERVICES AND THE WAR—109

British Summer Time—Canals and inland waterways—Busmen's gifts to war funds—Fare concessions to Home Guards and Civil Defence workers—Priority transport for workers—French railway re-organisation

British Summer Time, one hour in advance of Greenwich mean time, is to continue throughout the winter.

Turkey reverted to winter time on Sunday night, September 21/22.

4,000,000 Troops by L.M.S.R.

During the first two years of the war 14,132 special trains carrying more than 4,000,000 members of H.M. Forces and 104,694 tons of baggage have been run by the L.M.S.R. Nearly 350,000 wagon loads of stores, equipment, and ammunition have been carried in 10,328 special freight trains. This is in addition to the very large numbers of H.M. Forces travelling by ordinary trains.

Further London Evacuation

About 1,500 mothers and children left London on Thursday, September 25, under the Ministry of Health evacuation scheme, travelling to billets in the North, Midlands, and Home Counties. The total included some 1,000 mothers and children and over 500 school children. Earlier last month 630 school children left London in special parties, while during August a total of 2,275 mothers and young children and school children were evacuated.

Canals and Inland Waterways

The Minister of War Transport has set up a Central Canal Committee, which will meet under the chairmanship of the Parliamentary Secretary, Colonel J. J. Llewellin, M.P., to advise him on questions of policy affecting inland waterways and to co-ordinate the work of six Regional Canal Committees. This is one of the steps recommended by Mr. Frank Pick, who has recently carried out, on behalf of the Minister, an investigation into the possibilities of making more effective use of the canals and inland waterways of the country. The members of the Central Canal Committee, which held its first meeting on September 12 are :—

Mr. R. B. Emley	Chairman, N.E. Regional Canal Committee.
Mr. R. Davidson	Chairman, N.W. Regional Canal Committee.
Lt.-Colonel F. Rayner ...	Chairman, E.M. Regional Canal Committee.
Mr. P. Nadin	Chairman, W.M. Regional Canal Committee.
Mr. A. C. Lisle	Chairman, S.W. Regional Canal Committee.
Mr. S. R. Hobday	Chairman, London Regional Canal Committee.
Mr. M. Kissane	Representing the Canal Association.
Colonel Forrester Clayton, Mr. J. Ironmonger ... , Mr. J. O. Wood ...	Representing Canal Carriers.
Mr. J. Walley	Ministry of Labour & National Service.
Mr. D. W. Milford	Transport & General Workers' Union.

The Ministry representatives on the committee are Mr. R. H. Hill, Deputy Director-General (Inland Transport), and Mr. S. W. Nelson. The Secretary is Mr. E. R. Batten

As a result of Mr. Pick's recommendations, the six existing Regional Canal Committees have been reconstituted and strengthened with a view to providing an effective supervisory machinery composed of those already skilled and knowledgeable in the canals and canal traffic of the region to ensure that the canals and canal facilities are worked as a unit, and that their resources as a whole are used to the greatest advantage. The regional committees include representatives of other forms of transport and of Government Departments in addition to canal members. Their main functions are to organise effective operation of the canals and the full and efficient working of craft ; to survey traffic possibilities and to make sure the traffic conveniently waterborne is allocated as far as practicable to the canals ; to minimise empty running and to ensure that carriers keep their craft manned and in repair, arranging if necessary for the pooling of craft and investigating unreasonable delays ; to see that maintenance and dredging are properly carried out, and to arrange for the loan of plant, equipment, or staff for the purpose.

Mr. Pick also recommended the establishment of minimum guaranteed wages for canal workers with a view to the protection of the industry from loss of labour to other industries. Negotiations conducted through the regional committees have already resulted in agreement in most regions. Other recommendations made to the Minister by Mr. Pick are being acted upon. Among them are the examination and revision where necessary of tolls, rates, and charges ; the simplification and extension of the Government subsidy paid on transit tolls with a view to the attraction and retention of canal traffic ; the provision of warehouses, transit sheds, and terminal facilities in consultation with the Ministries of Food and Supply (many schemes are in preparation and some have been begun) ; the provision of mobile cranes, mechanical handling equipment, and boat engines, with assistance from Government funds ; the undertaking of a survey of traffic with a view to the allocation of suitable blocks of traffic to the canals ; the encouragement of consolidation of the canals and single undertakings within the various regions (negotiations will take some time but should result in improving and consolidating the position of the canal industry) ; and the abandonment as far as practicable of those canals which have no useful traffic purpose.

Fish Transport Charges

Until June 30 last there was no control of fish supplies or prices, but an interim price order was then introduced and, in order to ensure equitable distribution of supplies, it was agreed that the Government should pay the cost of transport until such time as a workable scheme could be devised. These interim arrangements are stated to have worked satisfactorily over a period of nearly three months and the Ministry of Food has now decided to continue them, subject to some adjustment of prices. Under the new scheme the producer will receive 6d. a stone more for his white fish than he would if this transport arrangement were not operative. This 6d. a stone will be collected through a levy on first hand sales and will be used to pay the transport charges. The carriage on herrings will be paid from the general fish fund and the producer's maximum price remains at 3s. 6d. a stone with no deduction for transport. The new order came into force on Monday last, September 29.

Bus Goodwill Advertising

At pages 136 and 137 of our August 8 issue we dealt at some length with a series of goodwill advertisements in local newspapers throughout the country by railway-associated bus companies. The Tilling group of companies has now prepared a number of further advertisements with the object of acquainting the travelling public, in the areas served by its vehicles, with some of the difficulties of operators during wartime. Typical advertisements refer to the need for constant overhaul of vehicles and the resultant necessity for relieving strain on the buses, which can be done by passengers travelling outside rush hours and thus helping to ease loading. The suggestion is also made that employers could assist their workers to avoid waiting in bus queues by staggering working hours, and similarly shoppers and others who can avoid doing so are requested not to use the buses at peak periods.

Restoration of Roads after War Damage

At a recent meeting of the Hull Corporation Highways Committee a letter was submitted from the Divisional Road Engineer recalling that, when a road or bridge was damaged by enemy action, the highway authority concerned is responsible not only for repairing the damage but also for restoring communications expeditiously. To do this it may be necessary either to divert the line of road or in some cases encroach on land not vested in the highway authority. When encroachment is unavoidable, arrangements should be made if possible for the work to be done by agreement with the landowner concerned, but, if agreement cannot be reached, Defence Regulation 50 gives the necessary powers to do any requisite work on the land. Should the landowner object to the public passing over his land, it may be necessary to take possession of it under the provisions of Defence Regulation 50. The

XUM

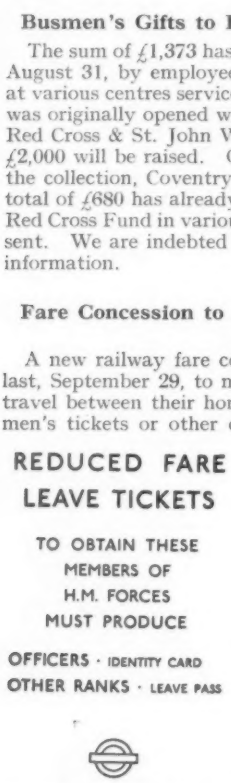
financial arrangement involved will depend on the scheme to be made by the Treasury under Section 41 of the War Damage Act, 1941. Liability for compensation under the Compensation (Defence) Act, 1939, must be assumed by the highway authority.

Busmen's Gifts to Red Cross & St. John War Fund

The sum of £1,373 has been collected, between March 14 and August 31, by employees of Midland "Red" Motor Services at various centres serviced by the company's buses. The fund was originally opened with the object of raising £1,000 for the Red Cross & St. John War Fund, but it is now expected that £2,000 will be raised. Of the various centres participating in the collection, Coventry headed the list with £233 9s. 3d. A total of £680 has already been paid in varying amounts to the Red Cross Fund in various towns, and further cheques are being sent. We are indebted to Mr. J. P. Savage for the foregoing information.

Fare Concession to Home Guards and Civil Defence Workers

A new railway fare concession came into force on Monday last, September 29, to meet cases of employees who normally travel between their homes and their place of work on workmen's tickets or other cheap tickets available for return on the day of issue only, and who, by reason of the performance of Home Guard, Fire Guard, or other A.R.P. duties at business premises, are prevented from travelling within the times covered by such tickets. On such occasions, employees travelling between their homes and their employers' premises or other place of work, are now able to obtain return railway tickets valid for two days at the cost approximately of single ordinary fare for the return journey. The concession has also been given to whole-time Civil Defence workers travelling between their homes and places of employment. Tickets are issued on presentation of certificates signed by the employer or Civil Defence authority. Forms of certificates are obtainable from the main-line railway company concerned or the London Passenger Transport Board. The arrangements do not apply on road services.



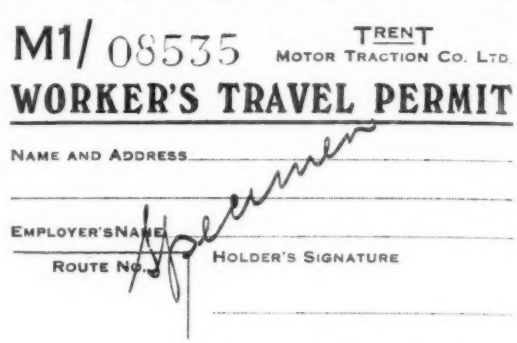
Poster displayed at stations in the L.P.T.B. area reminding service personnel of the prerequisites to the issue of reduced fare leave tickets

Priority Transport for Workers

The Trent Motor Traction Co. Ltd., which was responsible for the experimental issue of permits stamped by the bus company, granting priority of travel to regular passengers riding to and from work on the Mansfield—Nottingham service (see our September 19 issue, page 286), has now introduced a full-scale scheme for the area it serves. A leaflet inviting Trent bus travellers to register was circulated widely, requesting business and workpeople travelling before 9 a.m. to give their employer their name and address, the number of their bus route, and a statement as to whether they are regular or seasonal travellers. Employers were asked to classify these particulars under four headings, namely:—

1. Regular travellers (male).
2. Regular travellers (female).
3. Seasonal (or occasional) travellers (male).
4. Seasonal (or occasional) travellers (female).

Blank permits were then forwarded by the bus company to the employer, who was asked to fill in the permits and issue them direct to his employees. The "bus rationing" scheme came into force on Monday last, September 29, on congested routes. It has not been found necessary to introduce the scheme on all services, as on certain routes there is sufficient accommodation on the workmen's buses, both in the morning and evening, to cater for the public without the necessity for priority passes. There are four colours of Worker's Travel Permit (a specimen of which is reproduced) with distinctive meanings as follow:—



1. White—Regular travellers (male).
2. Pink—Regular travellers (female).
3. Blue—Seasonal (or occasional) travellers (male).
4. Green—Seasonal (or occasional) travellers (female).

The scheme originated entirely with the Trent Motor Traction Co. Ltd. (an associate of the L.M.S.R. and the L.N.E.R.) and has been sanctioned by the Regional Transport Commissioner. The Ministry of War Transport is believed to view the scheme very favourably, and is bringing it to the notice of other Regional Transport Commissioners with a view to similar schemes being introduced in other areas.

L.M.S.R. Road Motor Department in Wartime

Some idea of the widespread wartime activities of the L.M.S.R. in the Road Motor Engineer's Department was given on Thursday of last week (September 25) at an exhibition at Euston. These activities cover a wide field of operations and represent in the aggregate a large and important contribution to the war effort. In the main these wartime steps comprise efforts to increase the efficiency of the large fleet of L.M.S.R. motor vehicles; to conserve to the utmost the materials necessary for their maintenance; and to arrange for emergency repairs and maintenance in the event of war damage to workshops and equipment. The maintenance of collection and delivery services, particularly in areas which have been subjected to air attack, are a vital part of the rail transport organisation of the country, and a mobile repair column has been provided to facilitate putting back into service in the shortest possible time the maximum number of damaged vehicles. Even where road motor repair shops themselves escape damage, the mobile repair column, by increasing the capacity of fixed shops, can secure a return to normal in a much shorter space of time.

The first of the company's mobile workshops, built at the Wolverton works, was available for inspection. After completion of tests in service it is hoped to construct further units. Four mobile canteens have also been constructed at Wolverton; they are arranged in road and rail containers and are thus capable of being used either on a rail truck or on a road lorry. These alternative means of transport enable the canteens to be taken to the required spot by road or rail. In addition, the company has a mobile road canteen built on a Commer one-ton chassis. This vehicle is based on Euston and garaged in the road motor depot.

Where supplies of any particular materials are short or can be placed to better use in directions more closely associated with national armaments, alternative materials have been sought by the L.M.S.R., and new methods of restoring worn-out parts have been devised. The former is exemplified by the adoption of india rubber for parts of mechanical horses particularly susceptible to damage. For some time past rubber mudguards have been fitted on L.M.S.R. motor vehicles, and, with the urgent need for economy in labour and materials, experiments in the use of rubber have now

been carried a stage further. On mechanical horse tractors, which have to be operated in closely confined spaces, the parts particularly liable to damage are the scuttles, radiator grille, and wings. The use of rubber corners on the scuttles and of complete rubber grilles and mudguards in place of steel has proved so satisfactory that they are to be adopted for all new vehicles and will be fitted to all vehicles sent in for repair.

Restoring worn out parts and materials was exemplified by the details given of the reclamation of used oil and tyres. At present about 70 per cent. of dirty oil is recovered, totalling 14,000 gal. a year. It is being used successfully in engines and has been found to be equal in quality to new oil. Tyres are given specialist attention at various stages of wear, and, where the tread has worn smooth but sufficient rubber remains, the tread is re-grooved by appliances which have been installed in the company's main road motor workshops.

Extensive experiments have been carried out by the L.M.S.R. in the use of alternative fuels for road motor vehicles. Various types of gas producer have been tested thoroughly on specially-equipped vehicles, and have also been operated under service conditions; two vehicles so equipped have a combined total mileage of 41,558 to their credit. Vehicles are also under test with town gas carried in gas bags, some mounted on the roofs of the vehicles and some on trailers. A further contribution to the national effort in petrol economy is an arrangement whereby gas-starting equipment has been installed at various centres throughout the company's system. In cold weather, vehicles are easily started on town gas and warm up more rapidly than with petrol.

DEVON GENERAL

PETROL RATIONING

Restriction of Facilities (1)

The Company regrets that on and from Monday, 8th September, 1941, the following restrictions of facilities will apply:—

(1) THROUGH BOOKINGS FROM ROUTE TO ROUTE

Will not be issued; through booking tickets issued before this date will be accepted until their availability expires. The restriction will apply to through bookings at summation of fares or at less than summation, and will apply to Single, Cheap Day Return (including D.G. Tickets available for return by Rail and Rail Tickets available for return by D.G.), Period Return, and Period Travel Tickets.

(2) WORKPEOPLE'S DAY RETURN TICKETS

Will be issued on specified routes (at adult rates only) to passengers who complete their forward journeys at or before 9 a.m.; available for the return journey after 12 noon only and on the day of issue only.

(3) PERIOD TRAVEL TICKETS

Will be issued only to passengers who complete their forward journeys at or before 9 a.m.; available for the return journey after 12 noon only. Period Tickets issued prior to 8/9/41 will be accepted under the existing 10 a.m. time limit until their availability expires.

(4) CIRCULAR TICKETS

Will not be issued.

NEWTON ROAD, TORQUAY

UNACCOMPANIED PARCELS TRAFFIC

The Company's Regulations governing the conveyance of unaccompanied parcels have been revised and will apply as from 8th September, 1941.

Parcels will in future only be accepted between 9.0 a.m. and 12.45 p.m. and 2.0 p.m. and 5.0 p.m. on Mondays to Fridays, 9.0 a.m. and 11.30 a.m. on Saturdays.

The maximum weight allowed for any one parcel will be 42lbs.

Details of revised arrangements can be obtained from any of the Company's Offices or Parcel Agents.

THE WESTERN NATIONAL OMNIBUS COMPANY LIMITED

HEAD OFFICE:-

QUEEN STREET, EXETER

Phone: Exeter 4181/2/3

Two newspaper announcements of railway-associated companies concerning further reductions of facilities

Completion of London Transport Damage Repair

As a result of careful organisation, most of the London Transport railway system has been able to continue work practically without interruption, despite the heavy air raiding on the Metropolitan area last winter. Many repairs have been carried out with great expedition and some have already been recorded in our columns. In one or two cases, however, the damage has been greater, and it has been necessary to close short sections of line for longer periods and one of these has affected the northern (or Metropolitan Line) portion of the Inner Circle for a short distance. When this job is finished the London Passenger Transport Board will have completed the emergency repairs throughout the whole of its system on all routes—railway, tram, trolleybus, and motor-bus—affected by air raid damage last winter and spring.

Bus Census for U.S.A. Emergency

A defence inventory of all buses and lorries in the U.S.A. began to be taken on September 26.

South African Railway Staff

The fact that there are nearly 9,000 employees of the South African Railways & Harbours on active service, and 1,000 on full-time and 500 on part-time war work in the Union, was revealed by Brigadier C. M. Hoffe, General Manager of the S.A.R. & H., when he handed over at Hoy Park, Durban, on July 9, a field ambulance given by the Durban Railway Workshop & Harbour Engineering Employees, to Major A. G. Bee, who accepted it on behalf of the Department of Defence and South African Medical Corps.

Commercial Relations with Switzerland

In view of the terms of the commercial agreement recently signed between Switzerland and Germany, the Ministry of Economic Warfare announced on September 24 that the British Government is no longer able to continue the limited facilities hitherto accorded for the passage through the blockade and across enemy territory of materials for Swiss industry. The Government appreciates the difficulties of Switzerland's position, and will continue to give facilities, within reasonable limits, for the import into Switzerland of foodstuffs and fodder and of certain other goods exclusively for domestic consumption.

German Organisation of Railways in Occupied France

Vice-President Münzer, of the German State Railway, published in the *Zeitung des Vereins* an account of the problems facing the German officials appointed to bring the railway system in occupied France back to working order. With the exception of a few sections in the north and east, the whole of the system is under the supervision of a *Wehrmachtverkehrsdirektion* (WVD), or Military Transport Management, with headquarters in Paris. Its functions and relations with the French railway authorities are prescribed in the Armistice terms. This body has, however, as yet taken no direct part in working the lines, the old French organisation remaining in great measure as it was, with the well-known sub-divisions, "Exploitation," "Traction," etc.; in each of which there is a German representative. Some German railwaymen are also stationed at selected large yards, stations, workshops, and sheds. There were naturally enormous difficulties to overcome in restoring traffic, as many of the railway installations in the fighting areas, including track, buildings, signalling, and telephone apparatus were destroyed or severely damaged, principally by direct air attacks. When bombs struck an ammunition train or dump the effects were often far reaching, and the retreating French Forces also naturally did a good deal of damage. The first task therefore was to restore the permanent way, and German Pioneer and Engineer Corps were set to work on this at once.

The Vichy government undertook, in the Armistice agreement, to put the railways in order and the S.N.C.F. (French National Railways Company) had to set up a special reconstruction department, acting under German supervision. The telephone system had suffered considerable direct damage and, in addition, much had been removed for use elsewhere, but it is stated now to have been practically re-established, with the assistance of German troops, and the co-operation of German and French firms. The chaos which arose as the French retreated, disorganised traffic on lines which were undamaged. The various special trains and reserves of wagons that had been sent away there led to great congestion and much hindrance to traffic everywhere. Locomotives, according to German reports, had almost disappeared from the occupied region, as evacuees were rushed away, and the Germans had to provide many. Electric working was got going as soon as possible, where this could be done, in order to economise coal stocks.

It was, of course, to the interests of the French authorities to restore the railway services, as the provisioning of Paris

XUM

and other large centres provided serious transport problems. There were great shortages of milk, fats, greenstuffs, coal, and other necessities. The return of many thousands of refugees to their homes required large numbers of special trains, and the WVD itself imposed heavy requirements in the way of army service and leave trains. The German organisers have worked out a system of charges covering traffic between Germany and the occupied area, and—which it is of special interest to note—transit traffic to and from Spain. Notwithstanding the fact that German organising capacity is believed to have achieved much, there still remains a great deal to be done.

Wartime Train Services in France

At the end of the second year of war passenger train services in France are indicated in the timetables as having settled down to roughly one-third of those available in peacetime. Over most of the main lines two or three express trains and a similar number of stopping trains are scheduled daily in each direction. Railcars, which immediately before the war were being used in large numbers, have practically disappeared, owing to lack of fuel; conversely, the best service is being offered on lines which are worked electrically with current generated by water power. The number of mixed trains has been greatly increased—a development facilitated by the fact that all French freight stock is equipped with continuous brakes. The worst deceleration has taken place on main lines which cross from the occupied to the unoccupied zones; this affects particularly the South-East Region of the S.N.C.F. (late P.L.M.), stops averaging 45 min. in duration being enforced at Chalon-sur-Saône on the Marseilles main line, and at Moulins, on the Vichy route. Similar stops of 35 to 50 min. are made at Bar-le-Duc, on the Eastern Region Nancy line, and Langres, on the Belfort line, with the result that the two daily services in each direction over these routes average 7 hr. 11 min. for the 219·1 miles between Paris and Nancy, and 8 hr. 22 min. for the 275·4 miles between Paris and Belfort. Lyons is a little better off, the two regular services to and from Paris being allowed an average of 8 hr. 21 min. for the 317·5 miles between Lyons and Paris; for the 535·0 miles between Paris and Marseilles the average time is 14 hr. over the 95·1 miles. Between Paris and St. Quentin, Northern Region, there are five trains in each direction daily, taking an average of 3 hr. 14 min. Restaurant cars are shown in the timetables as running on all the principal trains. Paris suburban services are, on the whole, better than those immediately prior to the German invasion, though inferior to those of peacetime; the service begins later in the morning, and finishes earlier in the evening than heretofore. Steam-operated passenger services have been restored on a number of minor branch lines, to compensate for the withdrawal of road services owing to lack of petrol.

In view of the importance to Germany of the link with Spain, it is not surprising that the service between Paris, Bordeaux, and Hendaye, entirely in occupied territory and electrically operated throughout, is the best in France. A very fair version of the Sud Express is now scheduled, leaving Paris Austerlitz at 11 a.m., and covering the 362·1 miles to Bordeaux in 6 hr. 59 min., at an average of 51·8 m.p.h. throughout, including stops at Les Aubrais, St. Pierre-des-Corps, Poitiers, and Angoulême; the successive start-to-stop stages are run at 52·1, 56·8, 53·0, 53·9 and 53·8 m.p.h., respectively. Hendaye is reached at 9.15 p.m., in 10¼ hr. from Paris, and the northbound journey takes 10½ hr. These trains carry through coaches and sleeping cars between Berlin and Hendaye. There are four good services in each direction daily between Paris and Bordeaux, averaging 8 hr. 8 min., as compared with 8 hr. 16 min. before the German occupation. On the electrified lines of the Western Region, the best non-stop booking between Paris and Le Mans (131·0 miles in 146 min.) involves an average of 53.8 m.p.h., but the 120·8 miles between Versailles Chantiers and Le Mans are run in 130 and 131 min., at 55·8 and 55·3 m.p.h. respectively, and there is a booking at 53·5 m.p.h. between Chartres and Le Mans. Through cross-country services in operation include Dijon-Lille, Metz-Tours, Nancy-Tours, and Lyons-Bordeaux.

As to services between France and neighbouring countries, there are three daily trains in each direction between Paris and Brussels, but the average time occupied over the 192·3 miles is as much as 7 hr. 21 min., or well over twice the peacetime average. Between Paris and Berlin there are five daily services in each direction; three *via* Metz and Frankfort are shown as taking an average of 21¾ hr., and two *via* St. Quentin, Liége, and Cologne averaging just under 23½ hr. From Lyons to Milan the through service *via* Modane, the Mont Cenis tunnel, and Turin is allowed 11¼ to 11¾ hr. All through services on the Riviera are detained 30 min. at Cap Martin and an average of 1¾ hr. at Mentone. these stations having replaced Mentone and Ventimiglia as the French and Italian frontier points respectively. Precise information is lacking as to how far the general requirements of the timetables are being achieved.

Ban on Sunday Buses in Unoccupied France

It was reported on September 6 that in order to save petrol and oil no public motor services were to be permitted in future on Sundays in " unoccupied " France.

" Frontier " Stations in France

The French summer timetables indicate stops of considerable duration on through trains, and the termination and starting of local trains travelling inwards to the occupied and " unoccupied " parts of France, at the stations named in the following list. Presumably, therefore, these stations form the frontier points between occupied and " unoccupied " France on the lines mentioned :—

Frontier station	Line
Langon	Bordeaux—Montauban—Toulouse
Orthez	Bayonne and Dax—Pau—Toulouse
Monpont	Bordeaux—Coutras—Périgueux
Tours	Tours—Eastward
Cormery	Tours—Chateauroux
Vierzon	Orléans—Central France—Toulouse
Moulins	Paris—Bourbonnais—Vichy—Clermont—Ferrand
Paray-le-Monial	Paray-le-Monial—Lyons
Chalon-sur-Saône	Paris—Lyons (P.L.M. main line)
Seurre	Dijon—Bourg—Geneva and Modane
Mouchard	Besançon—Bourg—Lyons (no through trains)

Sabotage in France

In recent weeks there have been many reports of sabotage affecting railways in France. On August 22 it was reported that railway accidents were increasing, and attention was drawn to a mishap in which the Bordeaux-Geneva express was involved, causing injuries to 26 persons. The accident was said to have resulted from a faulty adjustment of points. M. Berthelot, Vichy Minister of Communications, took occasion to warn railway workers against propaganda which he said was aimed at inducing them to resist the Government. He added that this propaganda had already resulted in acts of sabotage in several regions. On August 26 it was stated that, among a large number of persons accused of acts of sabotage, railwaymen figured largely, and the authorities admitted that the main railway lines used by Germans in the occupied zone had had the tracks loosened and in some cases had been mined. Lyons radio on August 25 reported that there had been 100 cases of sabotage on the French railways.

Port Works at Alexandretta and Mersina

It was recorded in THE RAILWAY GAZETTE of September 19 that negotiations were in progress between the United Kingdom Commercial Corporation and the Turkish Ministry of Communications for the improvement of facilities for discharging cargoes from the ports of southern Anatolia, and that it was proposed that a jetty should be constructed at the port of Alexandretta, which, with the exception of that at Haidar Pacha, would be the largest in Turkey, and would be used for discharging locomotives and other heavy material exported to Turkey from Great Britain. As is recorded at page 343, a Reuters message states that a contract has now been signed for the reconstruction of piers at the Turkish ports of Alexandretta and Mersina, and the improvement of harbour facilities at Alexandretta. The work at Alexandretta is to be carried out by Braithwaite & Co. (Engineers), Ltd., London, through its Turkish subsidiary DECIF, and when completed will allow of the rapid discharge of goods at these two ports.

GOVERNMENT CONTROL OF RAILWAYS

Text of White Paper outlining the revised financial arrangements under the Railway Control Order, 1939

An outline of the revised financial arrangements between the Minister of War Transport, the four amalgamated railway companies and the London Passenger Transport Board has been presented to Parliament by the Minister of War Transport in the form of a White Paper as follows :—

1. As part of the financial arrangements made with the four amalgamated railway companies and the London Passenger Transport Board set out in Command Paper 6168, presented to Parliament in February, 1940, it was provided that, after the end of 1940, the Government or the railway companies and the board jointly might propose revision " for any cause of a major character " and that, if agreed, the arrangements should be revised accordingly (paragraph 11 of Command Paper 6168).

2. In view of the Government's decision to introduce legislation placing all public utility undertakings upon the same basis as regards war damage and in pursuance of the policy announced in the Budget Speech of minimising the impact of increased costs of transport upon the prices of essential goods and services, the Government and the four amalgamated railway companies and the London Passenger Transport Board have agreed that the existing financial arrangements should be modified and, as a result of negotiations, the arrangements have been revised.

3. The financial arrangements made in February, 1940, provided for a pool of the receipts and expenses of the controlled undertakings and a guarantee to them of a minimum annual sum subsequently agreed for these five undertakings at £39,444,776, with the right to them to retain any net revenue of the pool up to a further £3½ millions, and one half of any further net revenue of the pool until their respective standard revenues were attained. The cost of restoring war damage up to a maximum of £10 millions in any full year was to be charged to the pool and rates, fares and charges were to be adjusted to meet variations in working costs and certain other conditions arising from the war.

4. Under the revised arrangements fixed annual payments amounting to £43 millions are to be made from December 31, 1940, to the four railway companies and the London Passenger Transport Board as follows :—

	£
Great Western Railway Company	6,670,603
London & North Eastern Railway Company	10,136,355
London Midland & Scottish Railway Company	14,749,698
Southern Railway Company	6,607,639
London Passenger Transport Board	4,835,705
	£43,000,000

As is the case under the existing arrangements, there will be charged or credited (as the case may be) to the pool of receipts and expenses of the controlled undertakings :—

(*a*) the interest on capital raised or capital redeemed after the end of 1937 in the case of the railway companies and after June 30, 1939, in the case of the London Passenger Transport Board, and

(*b*) interest on any difference, between the amount of money invested by the railway companies in the excluded undertakings (see paragraph 6) and the amount so invested at the end of 1937.

5. In future the net result of the pool is for the account of the Government who will receive any surplus and make good any deficiency.

6. Net revenue derived from investments in road transport undertakings and from ownership of and investments in railways in Northern Ireland or Eire and from certain minor undertakings will continue to be excluded from the pool.

7. Maintenance charges (including renewals) are standardised on the basis of an average pre-war charge adjusted for variations in assets in service and in price levels.

If the actual expenditure in any year of control is less than the standard, the difference, representing arrears of maintenance, is to be invested in Government securities through trust funds in the joint names of H.M. Government and each controlled undertaking. These funds which will accumulate at interest will meet the cost of any arrears of maintenance overtaken during control, and at the end of control amounts equal to the net arrears of maintenance (calculated with reference to the trend of variations in prices) will be paid to the relevant undertakings. The balance of the funds, subject to meeting any approved claims arising out of control, will be passed through the pool account for the final accounting period of control.

In these respects the arrangements remain as originally agreed.

8. The previous arrangements in regard to

(*a*) payments by the undertakings of one-half of Exchequer grants made for air-raid precautionary measures (see note to paragraph 6 of Cmd. 6168), and

(*b*) revenue receipts and expenditure in respect of the requisitioning of privately owned wagons (paragraph 9 (*c*) of Cmd. 6168).

will continue.

9. War damage suffered by the controlled undertakings since the outbreak of war will be dealt with under the new scheme to be introduced by the Government for public utility undertakings and will not be charged as revenue expenditure. Having regard to the retrospective liability which the controlled undertakings will assume under the new scheme, they will retain at their disposal any sum charged to the pool account for the year 1940 under paragraph 9 (*b*) of Cmd. 6168.

10. The levels of rates, fares and charges will be determined by the Government during the period of control and the arrangement (paragraph 10 of Cmd. 6168) requiring them to be adjusted to meet variations in working costs and certain other conditions arising from the war, including war damage up to £10 millions in any year, will cease to have effect.

11. Control will be continued for a minimum period of one year after the cessation of hostilities. Before control comes to an end (*i.e.*, before all statutory rights and obligations as they exist at that time again apply to the controlled undertakings), time will be given for the operation of any statutory machinery governing the level of charges.

12. A corresponding revision will be made of the financial arrangements with controlled undertakings other than the four amalgamated railway companies and the London Passenger Transport Board.

Panama City Tramway System Discontinued

By mutual consent of the Government and the Cia. Panamena de Fuerza y Luz, the tramway service of the latter, for 27 years an important auxiliary of the Panama City transport system, was discontinued on the afternoon of May 31. Although the operating company had contended for several years that the tramway system was an economic liability, the suspension action was a direct result of a surprise order to this effect issued by the Ministry of Government & Justice on May 1, stating that " as a matter of public convenience," the tramway service should be suspended within ten days. Subsequently, as a result of consultation, the time was extended to May 31, and meanwhile negotiations for the transfer to the Government of leases on the company's car sheds for $15,000 cash were completed. Under the terms of the suspension agreement, the company is required to remove the rails, except where they are set in concrete as on the downtown streets. The tramway system has been in operation since 1914, and employed about 110 persons. In the early days it was a flourishing undertaking, but is reported to have been operated at a loss during recent years. The new transport franchise, in replacement of the tram service, is held by the Cia. Panamena de Autobuses, which proposes to expand its services and secure additional equipment.

XUM

Axlebox Design in India

Mr. H. P. Renwick's paper discussed

An interesting discussion followed Mr. H. P. Renwick's paper on "Some Practical Reflections on Axlebox Design" at a meeting of the Institution of Locomotive Engineers, held in Calcutta, and a report of which appears in the Institution Journal No. 160, recently issued to members. The hot bearing problem, as one of the speakers pointed out, is today very much to the fore on Indian railways and considerable advances have been made since Mr. Stanier, then President of the Institution, commented adversely on the hot bearing figures in India. In the new axleboxes measures are being taken to exclude dust and grit, larger bearing areas are being provided, and better maintenance organisations set up. It was stated, in referring to the relative merits of oil and grease, that castor oil is used extensively on the East Indian Railway and the opinion was expressed that this was the best lubricant procurable for the purpose.

Another participant in the discussion did not agree with the author that the temperature of the axlebox was independent of the type of locomotive, freight or passenger, but was a function of the lubricant and the design and not the size of the axlebox. He expressed the view that much was to be learned from the design of axleboxes used on the L.M.S.R., where the box was larger than those used in India although the gauge of the track was smaller. It had vanes on the sides behind the horn cheeks to assist in radiation and in that way, if heat can be radiated, the function of the lubricant is reduced and the results obtained on the L.M.S.R. in respect of miles run per hot axlebox provide sufficient proof that the size of the axlebox cannot be ignored.

Later in the discussion a speaker remarked that the author had rightly pointed out that carriage and wagon axleboxes could run satisfactorily for six months without repacking and, as they are only provided with underfeed lubrication and no top feeds, efforts should be made to design locomotive axleboxes on the same principle, instead of launching out on more elaborate and costly methods. On the Bengal-Nagpur Railway it has been proved that satisfactory results can be gained by eliminating top feed lubrication altogether from locomotive coupled and bogie axleboxes, reliance being placed solely on underfeed lubrication combined with systematic "teasing" and soaking of the waste and periodical repacking.

Monthly hot box meetings, presided over by the Deputy Chief Mechanical Engineer, are held on the Eastern Bengal Railway, and as a result of these the design of axleboxes has been standardised for several classes of engines. It was found that "XB" bogie boxes gave considerable trouble until they were converted to what is known as the Victorian system of oil lubrication, and the latest published statistics showed that these boxes will run about 700,000 miles between each hot bogie axlebox.

The author remarked that the point of his statement that increased bearing areas did not affect the running temperature had been missed by the speaker who commented upon it. It was clearly proved by the test results produced by the dynamometer car, which showed that there was no difference in the running temperature of axleboxes with 9 in. and 13½ in. length of journal.

MOBILE POLICE STATION FOR AUSTRALIAN TIMBER CAMPS.—A mobile police station for use in the main timber camp area of Australia will be in use within a few weeks. It is being built on a railway truck chassis and, as the timber is cut out, so the police station will move forward.

BABCOCK & WILCOX LIMITED.—A circular to shareholders states that in view of the large number of shareholders and the free market enjoyed by the company, the present time is opportune to adopt the modern practice of converting the company's share capital into capital stock.

CZECHOSLOVAK TRAVEL BUREAU (CEDOK) LIMITED.—A general meeting of the members of this company (which has been voluntarily wound up) will be held at 117, Queen Victoria Street, E.C., on Monday, October 6, at 2.30 p.m., to receive the account of the liquidator, and to dispose of the books, accounts, and documents of the company.

ARGENTINE RAILWAY WAGE DEDUCTION REFUNDS.—According to Reuters, the Argentine Ministry of Public Works has ordered the Buenos Ayres & Pacific Railway Company to refund to workers almost exactly half the deductions from wages made during 1939 to 1941. The total of 1,083,812 pesos is being returned. As announced in our issue of September 5, the company had been ordered to refund deductions of 826,076 pesos made in 1938 and 1939. The Buenos Ayres Western Railway Company will reduce deductions from staff wages from 8 per cent. to 5 per cent. as from October 1, owing to the increase in gross receipts.

MOTOR VEHICLES IN NEW SOUTH WALES.—The Commissioner for Road Transport in New South Wales, Mr. M. C. N. Neale, states that motor vehicles registered on April 30 last totalled 315,887, a decrease of 7,481 or 2·3 per cent. in 12 months. The increase in April on the previous month's registration was 98. The decrease in 12 months included a reduction of 6,716 in the number of motorcars registered, 889 motor cycles, and 591 lorries. Trailers increased considerably, pleasure trailers by 357 to 4,175, and commercial trailers by 537 to 3,607. New vehicles registered in April totalled 919 against 1,758 in April, 1940, a decrease of 839. Drivers registered at the end of April of this year totalled 467,471, a decrease of 8,038 in 12 months.

British and Irish Railway Stocks and Shares

Stocks	Highest 1940	Lowest 1940	Prices Sept. 26, 1941	Prices Rise/Fall
G.W.R.				
Cons. Ord.	52	22½	41	+ 1
5% Con. Pref. ...	103½	58	100½	—
5% Red. Pref. (1950)	105½	88	103	—
4% Deb.	107½	90½	107½	—
4½% Deb.	108½	96½	109	—
4½% Deb.	114½	96	115½	—
5% Deb.	124	106	128	—
2½% Deb.	66½	57	66	—
5% Rt. Charge ...	117½	97	124½	+ ½
5% Cons. Guar. ...	117	90½	121½	—
L.M.S.R.				
Ord.	24⅞	9	15½	+ ¼
4% Pref. (1923) ...	60½	21⅜	49½	− 1
4% Pref.	70½	35	63½	—
5% Red. Pref. (1955)	94½	60	93½	—
4% Deb.	101½	81	101½	—
5% Red. Deb. (1952)	109½	102	108	—
4% Guar.	93¾	65	94½	—
L.N.E.R.				
5% Pref. Ord. ...	8⅜	1½	2½	—
Def. Ord.	4⅜	1½	1½	—
4% First Pref. ...	60	20	48½	− 1
4% Second Pref. ...	22⅞	6½	17	− 1
5% Red. Pref. (1955)	80	34½	76½	—
4% First Guar. ...	86½	56	85½	—
4% Second Guar. ...	77½	37	75½	− 1
3% Deb.	73½	54½	75½	—
4% Deb.	97⅜	74	100½	—
5% Red. Deb. (1947)	107	96¾	103½*	− ½
4½% Sinking Fund Red. Deb.	104	98	101½	—
SOUTHERN				
Pref. Ord.	79	34	62½	+ 1
Def. Ord.	22½	7	14½	+ 1
5% Pref.	104½	58¾	98½	+ 1
5% Red. Pref. (1964)	105	85	103½	—
5% Guar. Pref. ...	116¾	90	121½	—
5% Red. Guar. Pref. (1957)	114⅞	94	111½	—
4% Deb.	106¾	84½	106½	—
5% Deb.	122½	100	126½	—
4% Red. Deb. (1962–67)	106	96½	105	—
4% Red. Deb. (1970–80)	106⅜	93	105	—
FORTH BRIDGE				
4% Deb.	95½	87	94½	—
4% Guar.	93½	81½	94½	—
L.P.T.B.				
4½% "A"	116	103	113½	—
5% "A"	121½	107	122½	—
4½% "T.F.A." ..	105½	101	101½	—
5% "B"	116	102	113½	—
"C"	65½	24	43	− 1
MERSEY				
Ord.	26	18½	20½	—
4% Perp. Deb. ...	92½	86½	95½	—
3% Perp. Deb. ...	68	63	70½	—
3% Perp. Pref. ...	57	50½	56	—
IRELAND				
BELFAST & C.D.				
Ord.	4	3	4	—
G. NORTHERN				
Ord.	4½	1½	7	—
G. SOUTHERN				
Ord.	12½	4	5	—
Pref.	15½	6	6½	—
Guar.	36	15	27½	+ ½
Deb.	55½	40	50½	+ ⅜

* Ex-dividend

Notes and News

Canadian National Railways.—Gross earnings during August last were $25,808,928, an increase of $4,588,740, and operating expenses were $20,637,196, an advance of $3,085,189, leaving net earnings $1,503,551 higher, at $5,171,732. Aggregate gross earnings for the eight months from January 1 are $193,179,858, an increase of $35,883,087, and the net earnings of $42,196,254 show an improvement of $18,155,405.

Great Southern Railways (Eire).—For the 37th week of 1941 the Great Southern Railways Company reports passenger receipts of £41,583 (against £34,694), and goods receipts of £60,432 (against £52,191) making a total of £102,015 against £86,885 for the corresponding period of the previous year. The aggregate receipts to date are passenger £1,492,449 (against £1,330,443), goods £1,872,620 (against £1,695,386), making a total of £3,365,069 (against £3,025,829).

Labour and Control of Railways.—At a meeting on September 24 of the National Executive Committee of the Labour Party a resolution was passed demanding nationalisation of the railways. The resolution expressed profound dissatisfaction with the recently announced "hire" agreement which the Government has effected with the railway undertakings, and added that the agreement "indicates an unfortunate unwillingness on the part of the Government to harness the transport facilities of the country effectively on the basis of public ownership and control."

George Medal for G.W.R. Stewardess.—Miss Elizabeth May Owen, Stewardess, ss. *St. Patrick*, has been awarded the George medal. The ship was attacked by an enemy aircraft with bombs and machine-guns. She was hit by a salvo, caught fire, broke in two, and quickly sank with the loss of many lives. Stewardess Owen groped her way in the darkness to the women's berths on the lowest deck of the vessel. She had difficulty in opening the doors of the quarters but forced them and brought five women and girls to the well-deck. Sailors offered her life-belts for her charges. She saw them put on, although there was none for herself. She then returned to bring away another girl. By this time the ship was sinking. Stewardess Owen could have reached the last life-boat but she would not leave the girl and jumped into the sea with her and supported her for nearly two hours, until they were rescued.

Opening of Berne Deviation Line.—On September 7, the four-track deviation in the city of Berne, referred to in THE RAILWAY GAZETTE of March 5, 1937, and June 27 last, was officially inaugurated in connection with the celebration of the city's 750th anniversary. The authorities, guests, and press representatives travelled over the line in an appropriately decorated twin-unit Red Arrow railcar, in which an address of welcome by Dr. Paschoud, the General Manager of the Swiss Federal Railways, and a description of the work by Dr. Eggenberger, Chief Engineer, were broadcast to all the compartments by means of loud-speaker equipment, with which this train—specially built for excursion traffic—is provided. The new layouts at both ends of the line were inspected on foot, the guests being conducted by Federal Railways engineers. Federal Councillors Celio, head of the Post-Office & Railways Department, and von Steiger, were present, and speakers at the subsequent dinner included Dr. Meile, President of the Federal Railways administration, who stressed the ever-increasing burden borne by the railways and their staffs under abnormal conditions; representatives of the Canton and Commune of Berne also spoke. Two tracks of the new line had actually been in service since July 23, and all four tracks since August 31. The removal of the old route has already begun.

German State Railway Bonds.—Holders of RM.150,000,000 4½ per cent. bonds of the German State Railway repayable December 1, 1941, are being offered 3½ per cent. twenty-five year bonds at 98¾ per cent.

C.N.R. Buys Coal from U.S.A.—The Canadian National Railways had been forced to buy United States coal because of the slowdown of production in Cape Breton collieries, Mr. R. C. Vaughan, President of the C.N.R. announced recently. Before the war Canadian coal was used as far west as Toronto, but now American coal was used as far east as Mont Joli, Quebec, and Edmundston, New Brunswick.

Newfoundland Railway.—The government-owned railway, taxed by pressure of heavy wartime traffic, has negotiated a United States loan of $2,100,000 for new rolling stock and other equipment. An agreement between the Government and the U.S. Reconstruction Finance Corporation provides for the loan at 2½ per cent. repayable in 15 years. New repair facilities will be built and additional rolling stock will include 100 flat wagons, 50 box wagons, five locomotives, eight coaches, and three sleeping cars.

Railway and Other Reports

Bolivia Railway Company.—Payment was made on October 1 of a half-year's interest of 1½ per cent. on the 5 per cent. mortgage and collateral trust income bonds and of 1½ per cent. on the non-assented old 5 per cent. first mortgage bonds.

San Paulo (Brazilian) Railway Co. Ltd.—Interim dividend for the year ending December 31, 1941, on the 5 per cent. non-cumulative preference stock, is 2½ per cent. actual, less tax. Warrants will be posted on October 22. Consideration of an interim on the ordinary is deferred until the accounts for the year are completed.

The Egyptian Delta Light Railways Limited.—No dividend has been declared on the preference shares for the year ended March 31 1941.

Trent Motor Traction Co. Ltd.—Interim dividend is 4 per cent. (same).

British Aluminium Co. Ltd.—Interim dividend 3 per cent. (same).

Churchill Machine Tool Co. Ltd.—Interim dividend is 15 per cent., less tax. (same) for year to December 31, 1941

Hoffmann Manufacturing Co. Ltd.—Interim dividend on ordinary is 7½ per cent., free of tax (same).

Vickers Limited.—An interim dividend of 4 per cent. (actual), less tax, on the ordinary stock for the year 1941 will be paid on October 23.

Ransome & Marles Bearing Co. Ltd.—Net profit, after E.P.T. and depreciation, £113,295; add £77,735 brought forward, making £191,030. To extra taxation on profits to June 30, 1940, £10,000, to provision for war damage £27,000, and to directors' remuneration £3,000. The dividend for the year ended June 30, 1941, is 20 per cent., and the amount carried foward is £76,305.

Imperial Chemical Industries Limited.—Interim dividend on ordinary is 3 per cent. actual in respect of 1941, the same as for each of the four preceding years.

Thos. Firth & John Brown Limited.—Interim on the "A" ordinary 4½ per cent. tax free, equal to 10·8d. a share, payable October 15. This compares with an interim of 6 per cent., tax free.

Stothert & Pitt Limited.—The report for the year ended June 30, 1941, shows that after providing for war risks insurance and other special war expenses, profits, before debiting taxation, amounted to £170,623 (£133,958). After provision of £93,000 (£42,500) for E.P.T. and £51,186 (£33,490) for income tax to June 30, there is a credit balance of £26,437. The sum of £2,300 is reserved for war damage insurance of buildings. Dividend on the ordinary shares for the year is again 10 per cent. less tax, and the bonus of 2½ per cent., less tax, is repeated. After transferring £7,553 to reserve fund, the carry-forward is £22,875 (£23,961).

Contracts and Tenders

It is reported from Ankara that the first of the locomotives and wagons ordered in Britain have arrived in Turkey. A further 83 locomotives and 950 wagons are expected.

The North Western Railway of India has placed an order for 30 mechanical stokers with the American Stoker Company in the U.S.A. These stokers are to be fitted to the 30 "N" class 2-10-0 goods locomotives, which were built for the G.I.P.R. and later transferred to the N.W.R. Hitherto oil-burning, they are now to be converted to coal-burning.

The Atchison, Topeka & Santa Fe Railway has placed the largest single order for diesel-electric freight power in the history of this equipment with the purchase of 15 locomotives of 5,400-h.p. each from the Electro-Motive Corporation, at a total estimated cost of about $7,000,000. Each of the 15 locomotives will comprise four sections of 1,350 h.p. each. These locomotives are in addition to five 5,400-h.p. units for this railway, two of which are now in service and three of which are now being delivered.

A Reuters message from Ankara reported on September 25 that a contract had been secured by a London undertaking for the reconstruction of piers at the Turkish ports of Alexandretta and Mersina, and the improvement of harbour facilities at Alexandretta. It was added that the contract had been signed that day by the Turkish Minister of Communications and by Lord Carlisle representing the United Kingdom Commercial Corporation. The contract for work at Alexandretta is valued at some £200,000 and has been awarded to Braithwaite & Co. (Engineers) Ltd. of London which will carry out the work through its Turkish subsidiary, Decif.

We are advised that the range of nuts and fastenings hitherto sold by Simmonds Aerocessories Limited under the title of Speed Nuts will henceforth be known as Spear Nuts.

XUM

Railway Stock Market

An attitude of caution again prevailed in the stock and share markets, although demand was slightly more active, and very little selling was in evidence. In fact, many securities remained in small supply owing to the firmness with which they are held, and the day-to-day trends of markets were governed mainly by that in British Funds. Home railway securities failed to show recovery from the moderate declines recorded at the end of last week, but have been fairly well maintained on balance, although the White Paper giving an outline of the Government's revised agreement with the railways had very little influence on sentiment. This provides additional details, but full information in regard to matters vital to stockholders is still awaited, particularly war damage and E.P.T. It appears that some part of the war damage suffered by the railways will be payable out of the annual rental, and it is, of course, very doubtful if dividends on the junior stocks could be maintained in the event of heavy air raid damage in the future. Nevertheless, the prevailing belief is that, so far as can be judged on the information contained in the White Paper, there seem to be reasonable grounds for hopes of dividends for 1941 being kept at the same rates as last year. The disposition, however, is to await the proposals to be introduced by the Government for dealing with war damage of all public utility undertakings. Meanwhile, until full particulars in respect of this and other matters are forthcoming, it would seem that home railway stocks are likely to continue to be valued on a high yield basis. It appears, however, that in many respects, sentiment is influenced more by the numerous occasions when the reasonable hopes of stockholders have been disappointed in the past, than by the details available of the revised agreement.

Great Western ordinary, which a week ago had reacted to 39½, has recovered to 40¾ at the time of writing, and the 5 per cent. preference stock and 4 per cent. debentures were virtually unchanged at par and 108 respectively. At 15, L.M.S.R. ordinary was fractionally lower on balance, but the 1923 preference was unchanged at 49¼, and the senior preference was 63. L.M.S.R. guaranteed stock, however, was lower on balance at 94½; the debentures remained firm and were unchanged in price. L.N.E.R. debentures were also firm, and the first guaranteed was maintained at 85½, although elsewhere the second guaranteed moved back to the slightly lower price of 75½. Subsequently L.N.E.R. first preference became firmer, and at 49 was fractionally higher compared with a week ago. This railway's second preference at 17¼ was slightly lower on balance. Although it is realised that, based on last year's dividends, home railway junior issues show large yields at current prices, the tendency at the time of writing has been for fresh buying to centre more on the preference issues, such as L.M.S.R. 1923's, and L.N.E.R. firsts, which continue to give generous yields, and also appear to have excellent prospects of receiving their full dividends during Government control, which is to be continued for a minimum period of one year after the war. Southern preferred attracted more attention for a similar reason, and improved on balance from 60½ to 62. Southern deferred at 14⅜ was fractionally above the level ruling a week ago; the preference stock was maintained in price; the debentures reflected the general firmness in prior charges of the main-line companies. In other directions, London Transport "C" at 41½ was below the price ruling a week ago, although the market remains hopeful of the maintenance of the dividend at 3 per cent. for the current year.

Although dealings were small owing to the surrounding trend on the Stock Exchange, foreign railway stocks were relatively firm, more particularly those of the Argentine companies. The latter were aided by the further batch of good traffic receipts and by the request to the Argentine Government for improved tariffs and better treatment in the matter of exchange.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1940-41	Week Ending	Traffic for Week: Total this year	Traffic for Week: Inc. or Dec. compared with 1940	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1940	Prices: Lowest 1940	Prices: Sept. 26, 1941	Prices: Yield % (See Note)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	834	21.9.41	16,190	+ 3,850	38	704,490	650,200	+ 54,290	Ord. Stk.	11½	3½	8¼	Nil
	Argentine North Eastern ...	753	20.9.41	ps. 217,600	+ ps.51,500	12	ps. 2,422,700	ps.2,100 600	+ ps.322,100	,,	3½	1	3	Nil
	Bolivar	174	Aug., 1941	3.850	+ 300	34	30,717	32,180	− 1,463	6 p.c. Deb.	6½	5	6½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds	8	5	6½	Nil
	Buenos Ayres & Pacific ...	2,801	13.9.41	ps 1,210.000	+ ps.116.000	11	ps.14,346,000	ps. 12,204,000	+ ps2,142,000	Ord. Stk.	4¼	1	5½	Nil
	Buenos Ayres Great Southern	5,082	13.9.41	ps.2,094,000	+ ps.305,000	11	ps.22.178,000	ps. 20,927,000	+ ps.1,251,000	Ord. Stk.	10⅜	3	8¾	Nil
	Buenos Ayres Western ...	1,930	13.9.41	ps 855.000	+ ps.215.000	11	ps.8,334,000	ps. 6,762,000	+ ps.1,572,000	,,	8⅜	2	6	Nil
	Central Argentine	3,700	20.9.41	ps. 1,946,500	+ ps.583,950	12	p..21,388.600	ps. 16,980,350	+ ps.4,408,250	,,	8¼	2	6	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	4	¼	2	Nil
	Cent. Uruguay of M. Video	972	13.9.41	22,333	+ 6,000	11	231 999	191,694	+ 40,305	Ord. Stk.	3¾	¼	4½	Nil
	Costa Rica	188	Aug., 1941	22.933	+ 758	9	47,559	40,856	+ 6,703	Stk.	23¼	14	13	15⅜
	Dorada	70	Aug., 1941	12.450	− 850	34	100,750	98.500	+ 2,250	1 Mt. Db.	99	97½	97	6 7/16
	Entre Rios	808	20.9.41	ps. 311,600	+ ps.91,700	12	ps 3,610,500	ps. 2.852 100	+ ps.758,400	Ord. Stk.	4	¼	4	Nil
	Great Western of Brazil ...	1,016	20.9.41	8.300	+ 200	38	335,700	368,000	− 32,300	Ord. Sh.	4/-	1/-	⅜	Nil
	International of Cl. Amer. ...	794	July, 1941	$448 277	+ $28.594	30	$3,484,852	$3,724.776	− $239,924	—	—	—	—	—
	Interoceanic of Mexico ...	—	—	—	—	—	—	—	—	1st Pref.	9d.	9d.	¼	Nil
	La Guaira & Caracas... ...	22¾	Aug..1941	8.580	+ 2.135	35	51,825	52,060	− 235	—	6	4	—	—
	Leopoldina	1,918	13.9.41	33,135	+ 7.222	37	943,433	822,592	+ 120,841	Ord. Stk.	2 2/16	¼	3½	Nil
	Mexican	483	14.9.41	ps 298.100	+ ps.29,400	11	ps 3,312,200	ps. 2,881,700	+ ps 430,500	,,	2/11¼	1/8	⅜	Nil
	Midland of Uruguay ...	319	July, 1941	13,892	+ 3,506	4	13,692	10,386	+ 3,506	—	—	—	—	—
	Nitrate	386	15.9.41	9,432	+ 1,316	37	101,153	128,117	− 26,964	Ord. Sh.	2¾	1	3	4 2/16
	Paraguay Central	274	20.9.41	$2,944,000	− $364,000	12	$40,456.000	$42,111,000	− $1,655,000	Pr. Li. Stk.	41	36	39¾	7 7/16
	Peruvian Corporation ...	1,059	Aug., 1941	71.658	+ 2,480	8	137.208	134,599	+ 2,609	Pref.	4	1	3½	Nil
	Salvador	100	28.6.41	c12,723	+ c1,600	52	c804,130	c981.987	− c177,857	—	—	—	—	—
	San Paulo	153½	14.9.41	28,750	− 4.063	37	1,380,415	1,354,735	+ 25,680	Ord. Stk.	50	23	41½	4 12/16
	Taltal	160	Aug., 1941	5,985	+ 3,520	8	9,165	4,550	+ 4,615	Ord. Sh.	15/1½	⅜	½	Nil
	United of Havana	1,346	20.9.41	19,603	+ 5,071	12	231.038	188,146	+ 42,892	Ord. Stk.	⅜	¼	2	Nil
	Uruguay Northern	73	July, 1941	1,324	+ 376	4	1,324	948	+ 376	—	—	—	—	—
Canada	Canadian National	23,560	14.9.41	1,292 780	+ 315,054	37	41.093,188	33 376,316	+ 7,721,872	—	—	—	—	—
	Canadian Northern ...	—	—	—	—	—	—	—	—	Perp. Dbs.	86	68	92½	4 4/16
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gr.	105¾	95 12	101½	3 13/16
	Canadian Pacific	17,153	14.9.41	879,600	+ 182,600	37	29,570,600	22,643,200	+ 6 927,400	Crd. Stk.	9 2/16	4⅜	10⅛	Nil
India†	Assam Bengal...	1,329	—	—	—		—	—	—	Ord. Stk.	99⅜	71	100	3
	Barsi Light	202	30.6.41	5.220	+ 2.670	13	51,990	33 127	+ 18.863	—	—	—	—	—
	Bengal & North Western ...	2 086	Aug..1941	227.325	+ 13,821	22	1,287,150	1,278,852	+ 8,298	Ord. Stk.	283	234	307	5 2/16
	Bengal-Nagpur	3,269	31 5.41	283,725	+ 21,334	9	1,509,300	1.552,418	− 43,118	,,	96	83¾	100¼	4
	Bombay, Baroda & Cl. India	2,986	20.9.41	311.175	+ 48.150	24	4,922 175	4 585 200	+ 336,975	,,	108	99	108¼	5¼
	Madras & Southern Mahratta	2,939	20.7.41	198,000	+ 52,453	16	2,227,029	1,947,242	+ 279,787	,,	104	97¾	102¼	7 7/16
	Rohilkund & Kumaon ...	571	Aug., 1941	47,025	− 2.174	22	301.312	301.286	+ 26	,,	284	238	300	5 2/16
	South Indian	2,500	20 5.41	140.378	+ 13,073	7	691.539	626,491	+ 65,048	,,	93¾	83	97½	4⅜
Various	Beira	204	July, 1941	74,593	—	43	727,546	—	—	—	—	—	—	—
	Egyptian Delta	610	20.7.41	7.047	+ 2 422	16	74,113	51.576	+ 22,537	Prf. Sh.	7/10½	¾	1⅜	Nil
	Manila	—	—	—	—	—	—	—	—	B. Deb.	53	44⅛	65	5⅜
	Midland of W. Australia ...	277	May, 1941	17,591	+ 3.683	48	167 924	145 304	+ 22,620	Inc. Deb.	88	80	89;	6 1/16
	Nigerian	1,900	28.6.41	44,945	− 12.185	13	697,968	499.238	+ 198,730	—	—	—	—	—
	Rhodesia	2,442	July, 1941	464,690	—	43	4,682,300	—	—	—	—	—	—	—
	South Africa	13,291	16.8.41	785,433	+ 68 629	20	14,684,614	13 246,644	+ 1,437,970	—	—	—	—	—
	Victoria	4,774	May, 1941	986,485	+ 241 016	48	—	—	—	—	—	—	—	—

Note. Yields are based on the approximate current prices and are within a fraction of ¼ Argentine traffics are given in pesos

† Receipts are calculated @ 1s. 6d. to the rupee